



# Natural Environment Strategy

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Volume 1

2006



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Moira Shire enjoys a natural environment with an abundant range of natural features dominated by river systems, wetlands, plains woodlands and grasslands some of which are among the most significant of their kind.

Located in North East Victoria, Moira Shire's northern boundary is the Murray River, which is one of the region's most significant environmental features along with the internationally RAMSAR significant Barmah Wetland, the largest River Redgum forest on the planet. The Murray River also provides high quality water which is the economic life-blood of the community.

Moira's numerous natural assets which also include the Goulburn, Murray and Ovens river systems, combine with a highly productive agricultural sector to create an attractive, vibrant and thriving community. Irrigated agriculture, particularly dairy and horticulture, is the shire's primary land use. Irrigation provides a wealth of opportunities and an ability to quickly adapt to changing markets and terms of trade, but it also needs to be carefully managed.

Moira Shire Council recognises the well being of our community is linked to that of its natural environment and is dedicated to developing and managing all of its assets to not only preserve, but also enhance, their environmental value.

A growing understanding of our environment has led to radical changes in attitudes, particularly in agriculture and catchment management, which are now directing enormous energy and resources into sustainable soil and water use.

Tourism and recreation, largely generated by visitors' attraction to the river environment, are a major source of income for the Shire, as is the retail activity centred on Cobram and Yarrawonga.

The region's high aesthetic values and natural resources also help attract a steady inflow of new permanent residents, providing a diverse and progressive community based on a stable population and healthy regional economy.

The Shire's abundant natural features also support an enormous range of native flora and fauna. Many threatened or endangered species find habitat and breeding grounds in the riverine forests and wetlands.

But it is also recognised that generations of land clearing and sometimes inappropriate land-use have come at a cost.

Over the past century much of Moira Shire was cleared of vegetation to make way for agriculture. While this has been essential for the region's economy, the environmental cost has only begun to be understood in recent decades. Major vegetation types across the Shire are severely depleted. Some species have disappeared entirely.

Most of the significant remaining vegetation is on roadsides or riverbanks, on public land or in small patches on private land. These remnant stands are often scattered and are vulnerable to inappropriate land-use, insect attack, water-logging and a range of other environmental hazards. Sensitive management is essential for their survival and replenishment.

As the statutory planning body, Moira Shire Council has a specific duty of care to protect this environment. This Natural Environment Strategy sets out to achieve this by establishing a common platform and direction for the Shire's specific issue plans which, combined, will provide a set of achievable goals in line with the community's aspirations, Council's statutory responsibilities and available resources.

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The Natural Environment Strategy outlines a number of objectives and outcomes that Moira Shire will seek to achieve over the next 10 years. The actions that have been developed to set the Shire along the path to achieving the outcomes are focused on a shorter timeframe, and will be reviewed regularly so that the Strategy remains relevant and active.

The desired outcomes of the strategy are to:

- Create practical policies to guide Council in areas related to the natural environment;
- Identify priority issues to guide Council and community action;
- Identify ways in which Council can better manage its natural environment;
- Enhance community awareness at the local level;
- Develop a sense of ownership of the issues and the actions;
- Develop a sense of pride in our environment and achievements; and
- Provide opportunities to work in partnerships in improving our natural environment.

The Moira Shire Natural Environment Strategy has been developed with the assistance of the Shire's Environmental Advisory Committee and other key stakeholders with the support and participation of Moira Shire Councillors and Council Officers.

The Moira Shire Council acknowledges that various agencies, and key stakeholders are involved in natural resource management and that many programs require a coordinated approach.

Implementation of the Natural Environment Strategy will commence in 2006 in partnership with community groups, schools, residents and statutory bodies such as government agencies and catchment management authorities. The Strategy, which will be subject to annual management reviews, will refer to and depend upon Council's other related Plans and Strategies such as Stormwater Management Plans, Strategic Statements etc.

A Natural Environmental Risk Profile will be used to determine and review the Strategy's priorities. As risks are mitigated or reduced due to successful actions, or increase as a result of changing circumstances, the Risk Profile will be updated to ensure the Strategy is adaptable to change and remains focused on the highest current priorities. While actions will be concentrated on areas of highest risk, it is recognised there is often a need to also address lower risk actions to achieve a total outcome. All actions will include delivery targets to ensure performance can be effectively monitored.

**The high risk areas and performance targets for the first 12 month period are outlined in Table 1.**

**Table 1: High Risk Areas and Targets**

	Item	Management Area
	<b>1</b>	<b>Roadside Management</b>
High Risk Activity	1.1	Road Construction and maintenance activities
Performance Target		Vegetation condition assessment (or preparation of an environmental management plan) undertaken of areas containing high value vegetation prior to any road construction and maintenance activities
High Risk Activity	1.2	Weed management on road shoulder – spraying activities
Performance Targets		<ul style="list-style-type: none"> <li>• All contractors and relevant staff undertake training in flora identification and accurate spraying techniques</li> <li>• Levels of weed infestation are managed in accordance with legislation and regional priorities.</li> </ul>
High Risk Activity	1.3	Insufficient information on significant roadside vegetation
Performance Target		Roadside vegetation is mapped showing areas of significance - within 12 months of adopting the Strategy and update roadside management plan
	<b>2</b>	<b>Waste Management</b>
High Risk Activity	2.1	Management of Cobram Landfill
Performance Target		Zero target for unacceptable ingress of leachate to groundwater - within 12 months of adopting the Strategy
High Risk Activity	2.2	Management of Cobram Landfill (closed cells)
Performance Target		Zero target for unacceptable ingress of leachate to groundwater - within 12 months of rehabilitation
High Risk Activity	2.3	Management of Yarrawonga (closed Landfill)
Performance Target		Zero target for unacceptable ingress of leachate to groundwater - within 12 months of rehabilitation
High Risk Activity	2.4	Management of Numurkah Landfill (closed cells)
Performance Target		Zero target for unacceptable ingress of leachate to groundwater - within 12 months of rehabilitation
High Risk Activity	2.5	Level of recycling effort
Performance Target		Reduction in volumes of waste going to landfill in accordance with Regional Waste Management targets – within 12 months of adopting the Strategy

	Item	Management Area
	<b>3</b>	<b>Stormwater Management</b>
High Risk Activity	3.1	Residential and open space run-off
Performance Target		Sediment, litter and organic matter loads from major drainage points to waterways reduced in accordance with Council's Urban Stormwater Management Plan
High Risk Activity	3.2	Industrial / Agricultural run-off
Performance Target		Zero target for high impact incidents relating to chemical spills or discharges entering waterways or groundwater (within 12 months for Industry and 5 years for Agricultural)
High Risk Activity	3.3	Commercial run-off
Performance Target		Zero target for high impact incidents relating to litter entering waterways
High Risk Activity	3.4	Road and highway run -off
Performance Target		Demonstrated reduction in sediment, litter and organic matter loads entering waterways from major drainage points within 24 months of adopting the Strategy
High Risk Activity	3.5	Residential and open space run-off
Performance Target		Sediment, litter and organic matter loads from major drainage points to waterways reduced in accordance with Council's Urban Stormwater Management Plan
	<b>4</b>	<b>Development and Planning Approval</b>
High Risk Activity	4.1	Sediment control on development and construction sites
Performance Target		No sediment loads to waterways from new development(s) approved from June 2007.
High Risk Activity	4.2	Clearing of native vegetation
Performance Target		<ul style="list-style-type: none"> <li>▪ On -going net gain in native vegetation across the Shire demonstrated</li> <li>▪ Establish enforcement program of compliance with planning permits and illegal clearing of vegetation</li> </ul>
	<b>5</b>	<b>Wetlands and Reserves Management</b>
High Risk Activity	5.1	Weed management
Performance Target		<ul style="list-style-type: none"> <li>▪ Levels of weed infestation are managed in accordance with legislation and regional priorities</li> <li>▪ Establish education program for staff and contractors</li> </ul>
	<b>6</b>	<b>Sewage, Sullage and Septic Tanks</b>
High Risk Activity	6.1	Existing sewerage systems and septic tanks
Performance Target		Develop domestic Waste Water Management Plan within one year of adopting Strategy and commence implementation

Moira Shire is situated in North-East Victoria, on the southern bank of the Murray River. The Shire covers an area of 4,057 square kilometres, and includes the major towns of Cobram, Nathalia, Numurkah and Yarrawonga, together with a host of smaller towns and communities.

Moira Shire lies on the alluvial floodplains of the Murray, Ovens and Goulburn Rivers. These rivers, associated wetlands and waterways, plains woodlands and grasslands are highly valued by the Moira community, and form a strong component of how the community connects with the natural environment. As with other regional areas, Moira's natural and environmental assets are being developed in a variety of ways – and future management and development of these assets must strike a balance across historical, cultural and physical elements.

Broadacre agriculture is the primary land use within the Shire, covering 71% of the land area and is divided equally between dryland and irrigated agriculture. As a result, much of the Moira Shire has been cleared of vegetation. Within Moira Shire 490,000 ha of land is used for dairying.

Retail activity is centred mostly in Cobram and Yarrawonga. Tourism and recreation are also significant industries, and is predominantly focussed on the natural environment, with activities centred on or around the Murray River.

**Figure 2.1: About Moira**

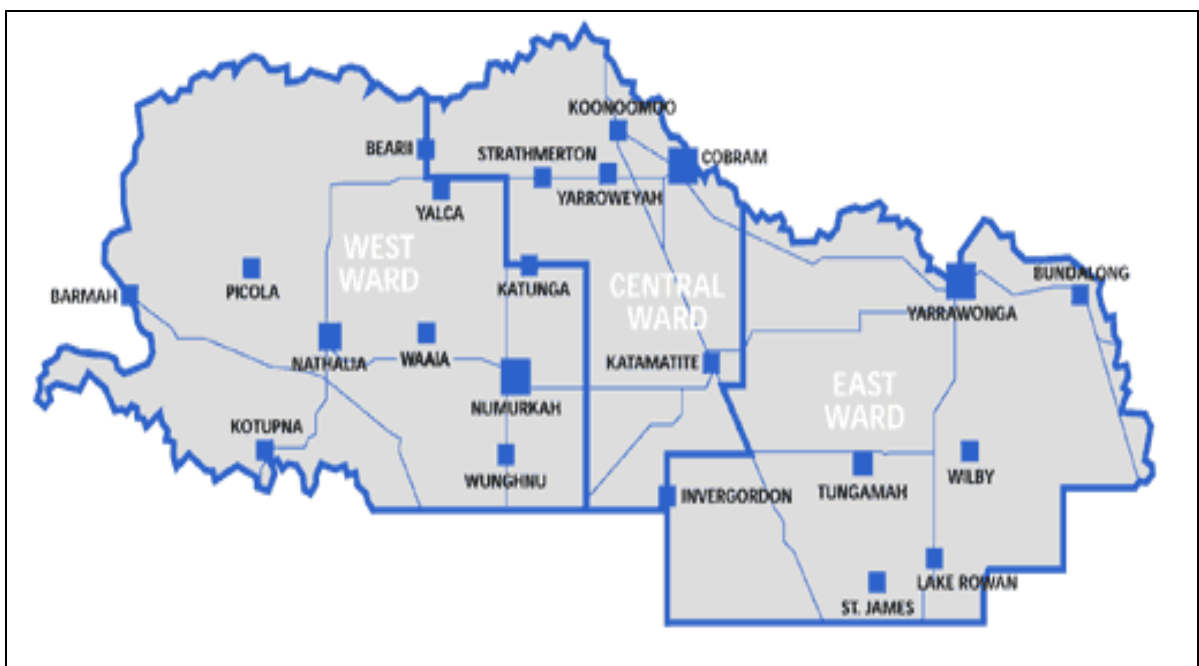
<p><b>Moira Shire lies 245 kilometres north-east of Melbourne and is just under three hours travel time from the CBD of Melbourne</b></p> <p>The Shire contains the following main communities:</p> <ul style="list-style-type: none"> <li>▪ Yarrawonga'</li> <li>▪ Cobram;</li> <li>▪ Numurkah and</li> <li>▪ Nathalia.</li> </ul>		
<p><b>People and lifestyle</b></p>	<ul style="list-style-type: none"> <li>• Population is approximately 27,000 and is estimated to grow to 29,000 by 2011</li> <li>• A quality country lifestyle that offers excellent value in housing</li> <li>• A clean environment and Mediterranean climate</li> <li>• A skilled labour force that values stability and diverse employment opportunities</li> </ul>	
<p><b>Location:</b></p>	<ul style="list-style-type: none"> <li>• Centrally located in a major business and economic region</li> <li>• Includes some of Victoria's richest agribusiness areas</li> <li>• Provides a significant regional market for Moira based businesses</li> <li>• Includes riparian areas and wetlands of regional, national and international significance.</li> </ul>	
<p><b>Resources, industry and infrastructure</b></p>	<ul style="list-style-type: none"> <li>• Primary industries include dairy, fruit, beef, grain and vegetables.</li> <li>• Other key industries include food processing, manufacturing, service and hospitality</li> <li>• High quality infrastructure (transport, energy) supports industry and associated activity</li> </ul>	
<p><b>Recreation and tourism</b></p>	<ul style="list-style-type: none"> <li>• Excellent sports and recreation facilities.</li> <li>• Easy access to the Barmah Wetlands and Barmah forest areas</li> <li>• The water level of Lake Mulwala is constant year round</li> <li>• There are over 100 sandy beaches along the Murray River</li> <li>• Water sports and activities – swimming, fishing water-skiing, river cruises and canoeing.</li> <li>• Picnicking, camping, bushwalking and bird watching</li> <li>• Cultural Heritage sites and cultural activities</li> </ul>	

## The Major Towns

Each town exhibits its own unique combination of opportunities and challenges regarding environmental management and planning:

- Yarrowonga has experienced the strongest growth in population because of its attractiveness as a retirement location and tourist destination, driven predominantly through its proximity to Lake Mulwala.
- Cobram has developed as a manufacturing and service sector for a broader area of Moira and the cross border area of Berrigan.
- Numurkah has developed as a secondary service centre and as a residential town for those working in Moira and Greater Shepparton.
- Nathalia has experienced slower growth in population and predominantly services the surrounding farming areas with facilities such as the Hospital.

Figure 2.2: Shire Map



### 3.1 Vision and objectives

The Natural Environment Strategy commits to a vision of sound, knowledgeable and shared governance of the natural assets within the Moira Shire. The Strategy is built around the following objectives, which were developed through the consultation processes:

- Improved community partnerships for environmental management with the emphasis on protecting and enhancing natural assets
- Enhance the community understanding of good environmental management practices
- Legislative compliance, whilst maintaining community ownership of services and natural assets
- Sustainable use and development of natural resources - air, water, land, flora and fauna, for the benefit of the Shire
- An integrated and co-ordinated approach that recognises the need to comply with existing strategies and policies for the benefit of the natural environment
- Best practice environmental management through education and example
- An informed community that values and acts in an environmentally sensitive and appropriate way
- Protection of the landscape so that it retains its unique character and is capable of supporting viable populations of indigenous flora and fauna.

A widely used definition of sustainable development is “development that meets the needs of the present generation without compromising the ability of future generations to meet their own”.

Council should ensure that development occurring today is managed in a responsible sustainable manner for the benefit of future of generations. To demonstrate and implement this conscientious approach the principles of the triple bottom line are applied, these being:

- Natural Environment: protect and enhance the environment through the efficient, considered and careful use of natural resources
- Social: meet the realistic social needs of the community
- Economic: promote economic success within the Shire without damaging the environment.

Moira Shire Council’s council plan includes the above principles and also includes consideration of the following:

- Built and Physical Environment – alteration to our surroundings, for example, through buildings, parks and facilities, roads, paths, and other infrastructure.
- Governance - Providing vision, leadership, transparent and accountable governance to the community of Moira Shire.

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## 3.2 Aims

The key aims of the Strategy have been developed to be consistent with Council's Corporate Plan and other strategies. The aims of the Strategy are to:

- Ensure that the management of the natural environment is part of a broader program that fosters the successful development of the area
- Adopt a Shire wide approach to the Strategy and recognise the partnerships and links that the Moira Shire has with the broader region
- Ensure that Council leads the Strategy while actively involving the community
- Have a vision for the Strategy that provides a longer term view, with annual programs established to drive specific priorities.

## 3.3 Purpose and outcomes

The purpose of the Natural Environment Strategy is to protect and enhance the environmental attributes of the Shire specifically relating to natural systems (soil, water and air) and biodiversity outcomes which in turn support sustainable agriculture and tourism and positively influence the local character of towns and settlements by ensuring development has regard to these environmental features.

In line with the above, the Strategy sets out a set of achievable goals and targets, which are consistent with Council's statutory responsibilities and can be progressed with available resources. The desired outcomes of the Natural Environment Strategy are to:

- Create practical policies to guide Council decisions in areas related to the natural environment;
- Identify priority issues to guide Council and community action;
- Identify ways in which Council can better manage its natural environment;
- Enhance community awareness at the local level;
- Develop a sense of ownership of the issues and the actions;
- Develop a sense of pride in our environment and achievements; and.
- Provide opportunities for others to work in partnerships in improving our natural environment.

### 4.1 Council Responsibilities

As Moira Shire Council is responsible for statutory planning, it has a specific duty of care regarding the protection of the natural environment. These responsibilities are underpinned by State and Commonwealth legislation that provides clear direction for all Councils and is supplemented by established policy and guidelines.

In the event of a breach in the statutory duty of care entrusted to organisations such as the Moira Shire Council the only realistic defence is that of “due diligence” which hinges on the organisation’s ability to show that it have taken all fair and reasonable actions to prevent such a breach.

To be able to demonstrate that this is the case there must be a documented process that shows that an assessment of risk has been undertaken, actions developed to reduce the higher or more significant risks and a plan for the implementation of these actions together with monitoring to review their effectiveness. This Natural Environment Strategy forms a key part of this process.

### 4.2 Strategy development process

The Moira Shire Natural Environment Strategy has been developed with and reviewed by the Environment Advisory Committee (EAC) and other key stakeholders. It has the support and participation of Moira Shire Councillors and Council officers.

An important step in the development of the Strategy was the series of workshops held with stakeholders to inform all participants and to gather feedback to assist with the process. Three workshops were held with stakeholders and community representatives to:

- Validate the natural environment risk profile
- Seek guidance on strategic objectives and targets
- Gather specific, practical suggestions for the implementation or action plans

The process was designed to consider a range of environmental management, protection and enhancement opportunities within the Shire’s boundaries and under the control or influence of Council. The process undertaken is outlined below:

- 1. Background Information Assessment and Study Gap Analysis:** involved reviewing all available and relevant information and considering whether any additional studies or assessments were required. This information was used to inform subsequent consultation, workshops and briefing sessions and has been included, or referenced as appropriate, in the Strategy.

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**2. Development of Environmental Values for the Shire:** characteristics of the Shire's natural environment, its assets and values were identified, and then a listing of the threats to these values was undertaken. The key assets and values included water, land, air, and biodiversity resources. The assets, values and threats were compiled through research and through consultation with:

- The Environment Protection Authority
- Goulburn Murray Water
- Goulburn Valley Water
- North East Water
- Goulburn Broken CMA
- North East CMA
- Department of Sustainability and Environment
- Department of Primary Industries
- Parks Victoria
- Trust for Nature.

**3. Property Management and Assets Condition:** the existing infrastructure within the Shire was reviewed along with an assessment of the current and future impact that these services and assets may have on the natural environment.

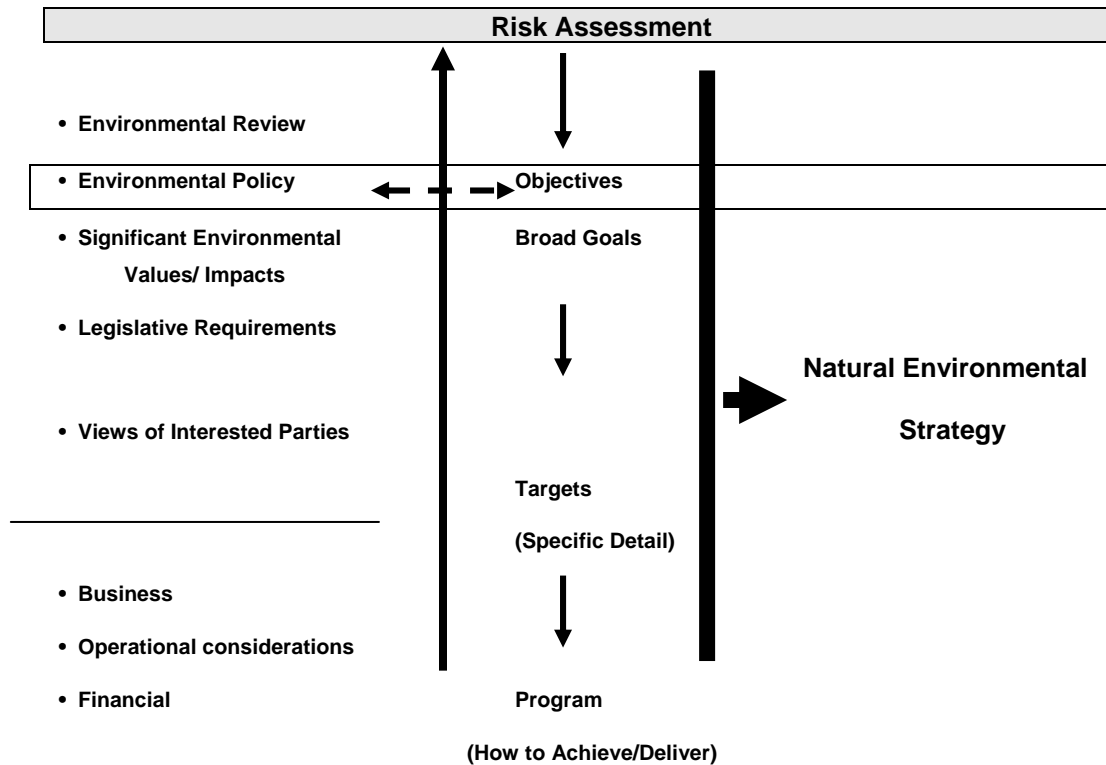
**4. Land Use and Planning:** key opportunities and constraints for the future development that may affect management of the natural environment were identified.

**5. Organisational Arrangements:** the responsibilities and influence of stakeholders and other authorities on the environmental values of the Moira Shire were documented and considered.

**6. Development of Environmental Risk Assessment, Objectives, Targets and Action Programs:** the environmental risk assessment brought together the environmental assets and values and the threats to these. The assessment then proceeded to formulate the environmental objectives and targets for the Strategy.

Objectives and targets have been specified and documented for all significant aspects of the Shire's natural environment. Figure 4.1 provides a schematic representation of how the major elements of the project, some of which are outputs or outcomes in their own right, combine to produce the Strategy. The process is designed to be transparent and capable of being updated.

**Figure 4.1: The Process**



**7. Consultation Process and Facilitation:** Three workshops were designed and held to share information, develop a similar level of understanding of the issues across all the participants encourage debate and promote acceptance of processes and outcomes. The Natural Environmental Strategy is built around the results from the workshops.

**Workshop 1: Values, Aspects and Impacts, Risk Assessment**

The environmental assets and values in the Shire and the aspects of activities that impact upon them were compiled and validated. A preliminary risk assessment was then worked through and the results discussed.

**Workshop 2 – Objectives and Targets**

Objectives were linked to the risks that were identified in Workshop 1 and the vision and policy statements were developed. Targets were identified to support the objectives. The results from this second workshop confirmed the preliminary framework for the Strategy.

**Workshop 3: Environmental Management Program**

The activities and programs that will achieve the targets were identified. This was an opportunity to encourage innovative problem solving and assess the feasibility of the options available to ensure that they could be implemented.

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### 4.3 Implementation, monitoring and reporting

The Strategy will be implemented from 2006 onwards. Council's Environmental Department will manage, monitor and evaluate the implementation of the Strategy. This will be done in partnership with the Environment Advisory Committee.

Indicators have been developed to monitor the progress and the results achieved by implementing the actions outlined in the Strategy. Reporting against indicators provides a transparent and comparable method for assessment of progress and subsequently supports Council's investment in this Strategy.

The Strategy will be reviewed annually to:

- Update the issues and associated risks;
- Monitor progress against the indicators and the underlying trends to determine the success or otherwise of the actions; and
- Determine the overall success and suitability of the Strategy for future needs and requirements.

The Victorian Commissioner for the Environment has issued a framework for State of the Environment Reporting (SoE). This type of reporting provides a significant opportunity to enhance our knowledge and understanding of our natural environment and to inform actions for better management.

An assessment of the degree to which the Moira Natural Environment Strategy meets the requirements for SoE has been undertaken as part of this project (contained in a separate document).

It is pleasing to note that based on the scores, the Strategy currently meets around 60% of requirements – which is an excellent starting point. This will facilitate the process of working towards SoE Reporting for Council into the future. A full assessment against the SoE framework is contained in Appendix 11.5.

## 5.1 Climate

Moira Shire has a temperate climate, with temperatures ranging from summer averages of 30.5 (max) to 14.9 (min) and winter averages of 14.2 (max) to 3.6 (min). Rainfall averages between 500 and 600mm per annum. The Shire experiences its maximum rainfall in the winter months and its minimum rainfall in summer. The south east of the Shire receives higher average rainfall than the north west areas, while temperatures in the north west of the Shire are higher than those to the south east.

## 5.2 Water and wetlands

### Murray River at Yarrawonga



Four major waterway systems flow through the Shire – the Murray River, Goulburn River, Ovens River and Broken Creek.

The Broken Creek is the major waterway, with almost all of its catchment lying within the shire. The major tributaries of the Broken Creek are Nine Mile Creek, Boosey Creek and Sandy Creek, all of which have a high environmental value.

The flows in the Murray and Goulburn Rivers are largely regulated, with the Murray experiencing peak flow during summer and the Goulburn during winter.

The Ovens River is mostly unregulated, with peak flows during winter and spring and low flows during summer. The Lower Ovens River, downstream of Wangaratta, is a declared Heritage River under the Heritage Rivers Act, 1992.

### Quinn Island



There are 103 sandy beaches along the Murray River between Yarrawonga and Barmah.

Go bushwalking around Quinn Island and discover a waterbird wonderland and an Aboriginal 'canoe tree'

Water quality in the receiving waterways of the Moira Shire is considered to be moderate (SKM 2002). These waterways predominantly flow through cleared agricultural areas and are subject to a variety of pollutants. There are water quality monitoring sites on Broken Creek (at Rices Weir near the junction with the Murray River), Broken Creek (at Katamatite) and the Murray River (at Lake Mulwala). Also several sites along the Broken Creek have been assessed using the Index of Stream Condition technique, which has been used State wide to compare the health of waterways. Long-term trend analysis indicates the phosphorus levels in the Broken Creek at Rices Weir are increasing an average of 7 ug/L per year ( Greg Smith GMW). Elevated nutrients contribute to algal blooms and nuisance aquatic plant growth. Algal blooms have been reported in a number of waterways including the Murray River at Cobram and Yarrawonga and the Broken Creek at Nathalia and Numurkah (CMPSF 1995). Increased suspended solids and turbidity reduce light penetration, smother benthic surfaces and reduce the invertebrate population and diversity.

Irrigation drainage water is the most likely cause but it is also noted that catchment and riparian vegetation clearing are key factors in increasing sediment loads in run-off leading to high turbidity in streams.



**Lake Mulwala**

Waterway health was also assessed in the Broken Creek at Katamatite, Carlands Bridge upstream of Numurkah, and downstream of Nathalia (EPA 1999). All three sites had below expected invertebrate biodiversity and were considered to be in only fair condition. The Broken Creek has relatively high habitat value, however elevated nutrients and turbidity were considered the main factors impacting on the ecosystem health (EPA 1999). Despite degradation, sections of the Broken Creek remain in good condition with sites such as Moodie Swamp, in the upper catchment of the Broken Creek, being continually monitored.

In the Murray River at Lake Mulwala water quality objectives were met for less than one third of samples regarding total phosphorus and total nitrogen levels (AWT 1999) and water quality levels were not met in the Broken Creek for suspended solids, total phosphorus and total nitrogen levels (AWT 1999).

Overall, water quality issues for the rivers in the Shire include:

- Algal Blooms
- Weeds
- Effluent discharge
- Bacterial contamination,
- Low dissolved oxygen levels, and
- Salinity



One of the major features of Moira Shire is the Muckatah, a natural wetland depression. This runs more than 80kms from Dowdles Swamp at Yarrawonga to the Broken Creek just upstream of Numurkah.

Kinnaird's Wetland was redeveloped as part of the Muckatah Catchment Drainage Scheme and is an excellent example of environmental works generating multiple benefits. It is one of the region's most significant wetlands and provides breeding habitat for a wide range of native species.

Recently installed walking tracks and hides are making it a popular tourism destination. Visitors can observe the many bird and animal species that have made the wetlands their home. The wetlands plays a valuable role as a retardation basin for the drainage scheme by reducing nutrients from entering the waterways and slowing down flows into the Broken Creek just upstream of the township.

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### 5.3 Biodiversity

The Shire's natural vegetation and abundant waterways play an important role in supporting native flora and fauna, providing habitat for migratory birds, and breeding habitat for threatened species such as the Murray Cod. The key biodiversity assets of the Shire include:

- The Murray River
- The Barmah Wetlands (a RAMSAR listed wetland)
- Plains Grassy Woodlands and Grasslands
- Broken Boosey State Park
- State listed species – including the Superb Parrot
- Nationally listed species including the Grey Crowned Babbler, Bush Stone Curlew and Yarran Wattle
- The Mulkatah catchment



**Barmah Wetland**

The Barmah Wetland, in the north west of the Shire, is one of the largest single stands of River Red Gum *Eucalyptus camaldulensis* forest in Australia and hence the world. The wetlands of the Barmah-Millewa Forest are of international importance and are listed as a RAMSAR site (EA2001). It is a high value area for its ecological, recreational, scientific, cultural and aesthetic values.



**Trout Cod**

The Murray River in this reach is significant for its population of critically endangered Trout Cod *Maccullochella macquariensis* (Douglas *et al* 1994) and also holds large stocks of other native fish species including Murray Cod *Maccullochella peelii peelii* and Golden Perch *Maquaria ambigua*. Billabongs along the floodplain support a diverse range of smaller fish species, amphibians and waterbirds.



**Road Reserve – Grassy Woodlands**

Woodlands and Grasslands are key biodiversity assets. The Plains Woodlands is historically the dominant vegetation type in the riverine plain and is now one of the vegetation types considered in need of re-establishment. Woodlands are a key catchment conservation target for investment. A description of Plains Woodlands and Grasslands is described in Section 11.1.



**Superb Parrot**

The survival of species such as the Superb Parrot and the Grey-Crowned Babbler is dependant on the protection and investment in woodland habitats. Moira Shire has the only population of Superb Parrot in Victoria and is the third most significant Shire in the State for Grey-crowned Babbler.

Research has shown that the Babbler would not survive without woodland habitat on roadsides.



The Great Egret

The forest contains a network of billabongs and wetlands. Low lying areas are subject to frequent flooding and after floods are covered with native grasses. The ridges and higher areas of the forest are covered by Grey Box and Yellow Box, with an understorey of shrubs and native grasses. The forest is home to at least 15 species of native mammals including Ring-tailed and Brush-tailed Possums and Grey Kangaroos (Fahey1986). 140 native bird species are found in the forest including the Superb Parrot, which is listed as vulnerable.

Many rare and threatened plant and animal species have been recorded in the region, including species protected under State and Commonwealth legislation. The Great Egret is listed by JAMBA and CAMBA while the White-bellied Sea Eagle is listed by CAMBA (EA 2001).

Many of the sites within the Shire are significant as they support native species and vegetation communities and require active management to protect and conserve their values. These sites are sensitive to modifications in land use, waterway management (including flood and drainage) and catchment management practices.

The quality and extent of native vegetation is an indicator of catchment health. The major vegetation types in the Shire are considered severely depleted and most of what remains is along roadside reserves, rivers and waterways, on public land and survives as small patches on private land. This vegetation provides key habitats for threatened species and also provides important ecosystem functions. Much of this remaining, remnant native vegetation is protected by State and Commonwealth legislation.

Weeds and pest animals pose a substantial threat throughout the Shire to natural assets as well as agricultural production.

A list and description of the rare and threatened flora and fauna species (excluding fish) and a list of the pest plants and animals in the Moira shire is provided in Appendix 11.3.

## 5.4 Geology and geomorphology

Moira Shire sits mostly within Riverine Plains that vary in elevation between around 150m ASL in the North to 300m ASL in the South East. Shallow groundwater aquifers are present across much of the Shire and in most places are between 3m and 50m below surface level. These aquifers provide high quality groundwater for a number of uses and a number of high yielding deep aquifers are present. Groundwater flow is toward the North West, following the general direction of the Broken Creek and its tributaries.

The geomorphology within these Riverine Plains is quite complex with major streams and anabranches within and across the catchments. They are often linked as part of a macro scale anabranching system and connect many neighbouring streams during flood conditions (SKM 1996).

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## 5.5 Soils

Soils across the region are uniform sand or red, yellow and brown duplex soils. Topsoils in the region are generally well drained and considered ideal for intensive agricultural production. However, subsoils can have a lower permeability and over watering through irrigation can result in perched water tables and water logging (LCC 1983).

Land has a varying capacity for sustainable production, depending on soil type, climate and rainfall. Land degradation includes erosion, salinity and weed spread – all of which are accelerated by disturbance. There are regions within Moira Shire that are vulnerable to erosion, rising ground water and salinity. The main cause of erosion and salinity is vegetation loss through either overgrazing or clearance. Vegetation helps maintain the watertable below the soil surface.

Soil maps that cover the Moira Shire region are included in Appendix 11.2. Soil information for the area west of the Ovens River is held by the NECMA.

## 5.6 Air Quality

The condition of our air is an important factor for our quality of life and affects the health of our community, the sustainability of our lifestyles and the natural environment.

Issues that have the potential to adversely affect air quality within the Moira Shire are predominantly in the form of either direct pollution (irritant/odour) or increased green house gas emissions and generally caused by:

- Increased urbanisation/industrialisation
- Increased personal and commercial transportation requirements
- Reduced areas of vegetation

Overall, Moira's air quality is considered to be good with no major or notable point source emissions reported by the National Pollutant Inventory.

### 6.1 Salinity

Salinity is one of the major land degradation issues presently being faced in Australia and is regarded as the single most costly environmental threat to the region because of the consequences of lost agricultural production.

Land and water are essential for agricultural production. Since European settlement of Australia around 100 million hectares (ha) of forest and woodland have been cleared, mostly for agricultural production (NFI 1998). Today, around 456 million ha, or 59% of land in Australia, are used for agriculture, making it the dominant form of land use. However, agricultural production has led to the degradation of soil and water quality in many regions. This degradation has taken many forms, including increasing levels of soil salinity, sodicity and acidity.

In recent years salinity has gained prominence as a national environmental issue (MDBC 1999; Commonwealth of Australia 2000; NLWRA 2001). While salinity, or the build-up of salts in the soil is a naturally occurring condition of the Australian landscape, it has been exacerbated by agricultural activities. There are two main forms of salinity, dryland and irrigated salinity. Dryland salinity is far more widespread. Salinity is caused by rising water tables brought about by the removal of vegetation and the excessive application of irrigation water.

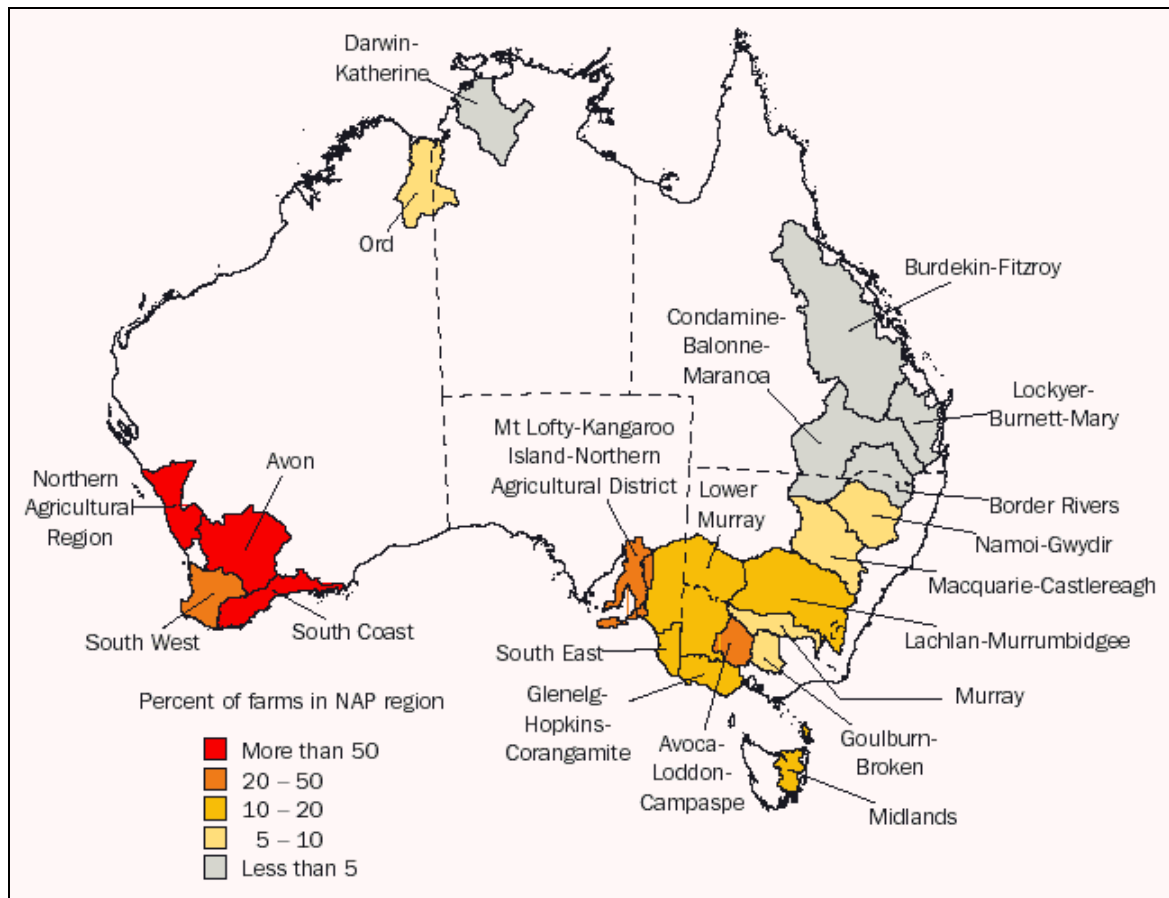
The annual cost of salinity to agricultural industries through lost production in 2000 was estimated to be approximately \$187m. While this cost is low compared to other land degradation issues, the impact of salinity is expected to increase in extent and severity in the coming years (NLWRA 2002a).

The impacts of salinity also extend beyond the agriculture sector. Roads, houses and water supply infrastructure are all degraded by it. In four states (New South Wales, Victoria, South Australia and Western Australia) the roads, buildings and/or water supply infrastructure of almost 70 towns are at risk of damage from salinity. Salinisation of freshwater rivers used for drinking water is increasingly an issue. It has been predicted that without effective salinity management, by 2020 the quality of Adelaide's drinking water will exceed health standards for salt around 40% of the time (MDBC 1999). Biodiversity is also at risk through the loss and degradation of native vegetation. Across Australia around 630,000 ha of native vegetation and 80 wetlands, including wetlands of international importance, are at risk (NLWRA 2001).

A significant proportion of agricultural land in Moira Shire suffers from the effects of raised water tables and associated salinity to the level where the area, serviced by Goulburn Broken CMA, attracts NAP funding (Figure 6.1).

High water tables are a major stress on native vegetation, with many species being highly sensitive to waterlogging and salinity. Consequently Moira Shire plays an active role in the regional catchment strategy, in which salinity and water quality have a high priority.

**Figure 6.1: NAP REGIONS, Proportion of farms affected by salinity – 2002**



Source: ABS data - Land Management and Salinity Survey, 2002.

## 6.2 Decline in soil productivity

Soil health (quality or productivity) is basically the capacity of a specific kind of soil to function, within natural or managed ecosystem boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality, and support human health and habitation (Karlen et al. 1996). Implicit, in this definition of soil health, is the concept of resilience or the ability to “bounce back” from setbacks in soil function (Kay 1990). These setbacks, or perturbations, can be due either to natural processes or human-induced processes. Waterlogging in clay soils after heavy rainfall and soil salinisation from irrigation are, respectively, examples of natural and human-induced processes. Within the region losses in soil assets have occurred with erosion, salinisation and sodification, acidification, soil structural decline, reduced soil biodiversity and lowered soil resilience:

Erosion, rising water tables, and subsequent soil salinisation followed from extensive periods of tree clearing in the late 1800’s. Erosion was also exacerbated by the explosion of rabbit populations prior to the introduction of the myxamatoxis and calici virus counter-measures.

Salinisation and naturally occurring soil sodicity are being exacerbated by unsuitable irrigation practices.

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Acidification has developed with the increased use of nitrogenous fertilizers and legume - based crops and pastures, both of which tend to increase pH in soils.

Soil structural decline has followed from increased natural slumping under irrigation practices, increased tillage under certain crops, loss of organic soil binding agents under cropping and the increased amount of traffic (both animal and tractor) under increasingly intensive agricultural practices. The alteration of soil structure and thereby the soil moisture regime, together with soil salinisation, sodification or acidification, restricts the range of possible environments in which soil biota can exist, hence leading to losses in soil biodiversity.

#### 6.2.1 Acidity

Soil acidification is a major land degradation issue threatening the sustainability and productivity of agricultural soils throughout the region. While soil acidification is a natural process agricultural practices have greatly accelerated the rate of acidification on all soil types. It is worth noting that soil carbon levels in the surface of most agricultural soils in Australia are now about half that of what they were before they were first cultivated (Baldock and Skjemstad 1999, Slattery and Surapaneni 2002). Thus our agricultural soils are now less able to resist a decline in soil pH and will acidify much more rapidly than when first farmed.

The major causes of the acidification process are listed below:

- Nitrate leaching
  - Legumes in rotation
  - Dry summer ecosystems
  - Extent of perennial pastures
  - Application of phosphorus fertiliser
- Product removal
- Soil texture

#### 6.2.2 Erosion

Erosion of the earth's crust is a naturally occurring process, that has resulted in the reshaping of the landscape over many thousands of years and is continuing at a very slow rate, this is commonly termed 'geological erosion'. The impact of human intervention on the landscape has resulted in more rapid rates of erosion than that attributed to geological weathering and is termed 'accelerated erosion'. In Australia, accelerated erosion has led to the loss of valuable surface soil that is limited in this fragile and highly weathered continent.

Soil erosion occurs whenever the soil is denuded of vegetation and exposed to the impacts of wind and rainfall causing surface loss of soil particles. The movement of these soil particles has three major impacts on the environment:

1. The loss of surface soil causes a general decline in the productive capacity of the soil, due to a loss in soil structure and nutrient content
2. The movement of large amounts of soil particles to waterways leads to a decline in water quality with the transportation of adsorbed nutrients and toxic pollutants
3. The final destination of sediments results in the choking of waterways and the concentration of chemical pollutants to public utilities such as reservoirs, lakes and harbours.

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Agricultural practices and infrastructure barriers (roads, urban development) have contributed to the movement of water and soil particles in the landscapes. In the region there are many important waterways that carry fresh water to the Murray system that are at risk of being contaminated with large quantities of clay minerals and soil nutrients, the direct result of accelerated erosion in our catchments.

The main causes of soil loss are related to a decline in perennial vegetation. Annual crops and pastures allow the soil surface to become exposed over the summer months, making them very susceptible to erosion.

### 6.2.3 Biodiversity of the soil resource

Soil biodiversity refers to the assemblage or consortia of soil fauna (macro, meso and micro) and flora (fungi, actinomycetes, bacteria and viruses) that inhabit the soil matrix. Soil biodiversity can refer to the assemblage of taxa (structural biodiversity) or to the assemblage of vital functions that are performed (functional biodiversity).

Our entire plant-based production enterprise depends to a significant degree on the organisms that inhabit the soil. The likely main impacts of declining soil biodiversity across the Moria Shire are:

- Weakened soil resilience resulting in reduced recovery capacity and increased susceptibility to disease incursion
- Poor performance of plant species in acid, alkaline, sodic and saline soils (at least as a side effect).

As with soil acidification and salinisation, it is extremely difficult to separate the economic losses incurred through soil biodiversity decline. A proportion of losses incurred through disease in plant-based enterprises, fertiliser and biocide applications, and nutrient and pesticide run-off in water would be attributable to soil biodiversity decline.

The marketing of 'Clean Green' produce might one day be linked to the impact of farm management effects on soil biodiversity.

## 6.3 Flooding

Areas of the Shire are subject to flooding due to the number of rivers and waterways, the topography and the use of irrigation channels for drainage. Council is critically aware that inappropriate development within designated floodplains can exacerbate flood impacts along the floodplain on all assets – including the natural environment.

## 6.4 Loss of Biodiversity

Biodiversity refers to the sum of all our different native plants, animals and organisms, along with their inherent genes, their habitats and the ecosystems of which they are an essential part. Since many native species need specific environmental conditions to survive, loss of habitat is the main cause for some species being lost from local areas. If this happens in many regions, it can lead to extinction.

The ecosystem services provided by biota depend on there being a diversity of life forms performing a range of functions. Diverse species underpin processes that help prevent erosion and control salinity, filter and purify water and assimilate wastes, provide protection from floods and control of pests and diseases, maintain fertile soils that are the basis for agriculture, attract tourists, and provide cultural, spiritual and intellectual fulfillment in different ways to all people.

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Historically, one of the main threats was broad scale clearing for agricultural use. Land clearing destroys plants, entire habitats and local ecosystems and removes the food and habitat on which other native flora and fauna rely. Clearing also allows weeds and pest animals to colonise and spread, increases greenhouse gas emissions and can lead to soil degradation, such as erosion and salinity, which in turn can harm water quality. In the Moira Shire today, small scale clearing, incremental loss of quantity and quality, lack of recruitment and enhancement are serious threats. These are not attributable only to agriculture but to other development including urban and infrastructure development and insufficient investment in habitat restoration.

Other threats include overgrazing, which can damage shrubs and grasses and stress remaining plants and trees, and excessive firewood collection and the removal of dead, hollow bearing trees which decreases available nesting and refuge sites for native fauna. Overall, only around 7% of the native vegetation cover of the region at European settlement remains and the on-going degradation of roadside and stream vegetation and fragmentation of habitat continues affects the viability of species.

## 6.5 Efficient use of water resources

Eight years of low rainfall across the State combined with a growing population base, the effects of climate change and degrading river systems have confirmed the need for better ways to secure water resources for the future. The Victorian State Government has recognised these issues and instigated a process to reform how water in Victoria is allocated, used and conserved.

*Our Water Our Future* sets out 110 new initiatives for water conservation aimed at every sector of the community. It examines household use, industrial and agricultural use, recreation and tourism, environmental impacts, pricing, population increases and climate change to ensure there is plenty of water to sustain growth over the next 50 years.

Its groundbreaking actions will:

- Repair Rivers and groundwater systems – the natural source of all our fresh water – by giving them legal water rights and conducting restoration works.
- Price water to encourage people to use it more wisely
- Permanently save water in our towns and cities, through common sense water saving and recycling measures
- Secure water for farms through pioneering water allocation and trading systems.

The Moira Shire, through interactions with the various State Government Agencies, has a role to play in these initiatives.

The Moira Shire Council has particular responsibilities to ensure that water saving occurs throughout the urban development centres of the Shire. Both domestic and commercial water users, should be actively encouraged to meet water use efficiency objectives. The Moira Shire can actively assist in meeting these outcomes.

The Moira Shire Council also has the duty to support efforts made by the other statutory authorities who have carriage of this initiative such as the Goulburn Broken CMA, EPA and Goulburn-Murray Water, to secure water supplies into the future. More efficient water use has the potential to make additional water available for expansion of irrigation on suitable land and to provide additional flows for the environment.

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Across the Shire efficient irrigation management is required to minimise water use, reduce infiltration to the water table and lessen the downstream impacts from drainage (eg. nutrient inputs, decreased water flows, loss of storage, loss of wetlands and biodiversity). Elevated water tables and clearance of vegetation adversely affect the capacity of dryland catchments to reduce rainfall runoff and extend the duration of runoff events. There is a recognised need to encourage practices that seek to use rainfall more effectively, while ensuring that this does not result in adverse impacts on river or ground water health.

The pollution of waterways by nutrients flowing from excessive irrigation drainage, sewerage, sediment mobilisation, and intensive animal industries has also become a major issue across the catchments within Moira Shire. One major consequence is the blooms of blue-green algae that occur frequently, threatening health of people and stock and industries such as tourism.

The increased use of streams and rivers in the Catchment by people since settlement has led to problems like stream instability, bank erosion, flooding, and associated threats to public and private assets and habitat.

Moira Shire recognises the environmental significance and sensitivity of riparian areas in particular and the need to observe best practice in managing development and recreational activities in riparian and adjacent areas.

## **6.6 Management of effluent**

The Shire is responsible for ensuring that developments, including intensive agricultural enterprises (feedlots, dairy etc), either discharge effluent to a suitable treatment facility or have appropriate onsite methods of treatment and disposal. Waste minimisation and reuse should be encouraged and it is important that the location of sewage treatment facilities (septic or land applied) or disposal sites, avoid sensitive environmental areas and that their impacts are contained. These practices need to be monitored and show compliance with legislative requirements.

The Murray Darling Basin Commission has objectives to improve inputs to the Murray River. One of the key areas is to have all urban sewage disposed of and reused totally off the river, and where this is not practicable, treated to an acceptable tertiary level so as to improve water quality in the river system.

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### 6.6.1 Local Wastewater Management Profile

Moira Council's data base identifies 647 registered septic tanks. This is significantly less than the number of households within the Shire that are not connected to a reticulated sewerage system. The total number of septic tanks is expected to be greater than 5000. All occupied dwellings that are not connected to reticulated sewerage therefore must be connected to a septic tank system. Moira receives in the order of 250 septic tank complaints a year and processes on average 120 new septic tank applications per year.

Council is currently preparing Domestic Waste Water Management Plans for the shire. These will assist in the management of existing septic tank installations and identify the suitability of new developments for septic tank systems.

The plans will identify priority townships where management of domestic wastewater is of concern.

The majority of townships within the Shire contain small allotments with poor soil permeability and are closely situated to river systems.

### 6.6.2 Tungamah Draft Waste Management Plan

In order to assist in the development of a Domestic Waste Water Management Plan for the shire, council undertook a pilot program at Tungamah.

The process involved: establishing a project management team; gathering information such as septic tank system types and those systems that were observed to be failing; comparing similarities of other non sewerer towns within the shire; and a Public Health and Environmental risk assessment for the Tungamah township.

Strategies have been identified aimed at delivering the desired outcomes for Tungamah based on the collected information. Priorities have been established based on the risk assessment and best values practices.

With endorsement from the community these actions will now be allocated with responsibilities and timelines and then be submitted to Council for approval and ultimately the adoption of the DWMP.

## 6.7 Management of stormwater

Unlike sewage, stormwater is not treated before it enters waterways. In urban areas, stormwater accumulates pollutants such as oil and grease, litter and nutrients as it flows over roads and other hard surfaces. Stormwater has been identified as a major contributor to waterway degradation.

In northern Victoria, the Goulburn Broken Regional Catchment Strategy (GBCMA 1998) includes a river and water quality program which aims to "maintain and where necessary improve existing water quality in the rivers of the Goulburn Broken Catchment". The Regional Catchment Strategy envisages a series of coordinated measures – the control of nutrient inputs from a range of sources including stormwater is a component.

On a larger scale the Murray Darling Basin Commission has objectives to improve inputs to the Murray River by having all options for achieving sustainable management (disposal and reuse) of urban stormwater investigated and a plan of action prepared for each town along the river systems in the Basin.

Moira Shire Council has commissioned an Urban Stormwater Management Plan to assist with the management of this issue.

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## 6.8 Pest plants and animals

Pest plants and animals are a serious and expanding problem in the Shire. Terrestrial, woody and aquatic “pests” are seriously impacting on biodiversity and agricultural production.

Confusion over, or disregard for, statutory responsibilities for weed management is exacerbating the problem, as is the continuing lack of enforcement and the withdrawal of weed management staff by government agencies.

### 6.8.1 Exotic Animals

Exotic animals that are considered as pests in the catchment include rabbits, wild dogs and horses, pigs, foxes, feral and domestic cats and goats.

In waterways, carp are a major problem, stirring up sediment and causing decline of native species. Some native animals are also considered pests when their numbers increase to levels that threaten agricultural enterprises, these include kangaroos, wallabies, cockatoos, galahs and wombats.

### 6.8.2 Terrestrial weeds

Weed infestations are accelerated by poor land management and climatic conditions, causing an increase in weed spread and providing harbour and food sources for pest animals. Weed invasions are responsible for reduced land and stock productivity and threaten the integrity of native vegetation and wildlife. There is increasing attention on the existence, emergence and spread of woody weeds such as willows, pepper trees and “feral” olive trees within the region.

### 6.8.3 Aquatic weeds

Aquatic weeds grow profusely in most areas of water across the Moira Shire, but are particularly troublesome where water run-off containing high levels of plant nutrients feed them. Examples include run-off from golf courses and fertilised pastures, and various kinds of effluent.

Moira’s streams, wetlands and water storage facilities are vital resources for biodiversity, agriculture, recreation and fishing. Highly invasive aquatic weeds such as arrowhead and alligator weed are posing a serious threat to these resources and are having serious impacts on our streams and wetlands, reducing biodiversity. They can smother and choke a waterway, leading to reduced oxygen levels in the water and subsequently less fish activity, displacement of native plants, reduced bird life and increased mosquito breeding. There are also economic costs. Livestock drowning can occur when animals mistake a water body covered in aquatic weeds for pastures and pumps and other irrigation equipment can become clogged with weeds.

Controlling aquatic weeds such as arrowhead and alligator weed poses major challenges. Waterways are environmentally sensitive systems and have high commercial and recreational importance. In water storage facilities, chemical control is normally not an option for aquatic weeds, leaving only mechanical control as a solution. Methods to help stop the spread of weeds includes becoming familiar with weed species, practical equipment hygiene, correct disposal of pond and aquarium plants and seeking appropriate advice from council weed experts.

The GBCMA has a major program to remove willows from streams because of the ecological impacts they have on stream and riparian biota.

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## 6.9 Climate Change

It is now widely accepted that climate change is happening and will have long term impacts on our environment. The rate of change and level of impact is still the subject of much research and debate. However the basic assertion is that climate change will result in rising temperatures and falling rainfall combined with an increase occurrence of extreme events such as storms.

Like the rest of the world, the Moira Shire is only beginning to grapple with the question of how its industries and other land-uses affect the composition and function of the atmosphere. The region has a lot at stake in relation to climate change and stability. The area's primary industries - agriculture, fruit growing and dairy - would suffer negative impacts from climate change. The region is both a positive and negative contributor to climate stability. Contributions to greenhouse gas emissions are made through intensive dairy, cattle and sheep farming, while carbon sinks are provided by existing vegetation and revegetation efforts.

There is a long list of impacts from climate change that can be split into three main headings - impacts on the built environment (including infrastructure), the natural environment and human aspects, including health impacts. These factors have economic impacts, including reduced economic growth from changes in profitability of industries such as agriculture and tourism. There is also the impact on the cost of repairs, maintenance and replacement of buildings and infrastructure. By undertaking risk management and adaptation strategies, councils can improve their planning processes and undertake works at low cost now, avoiding the need for large budget works in the future.

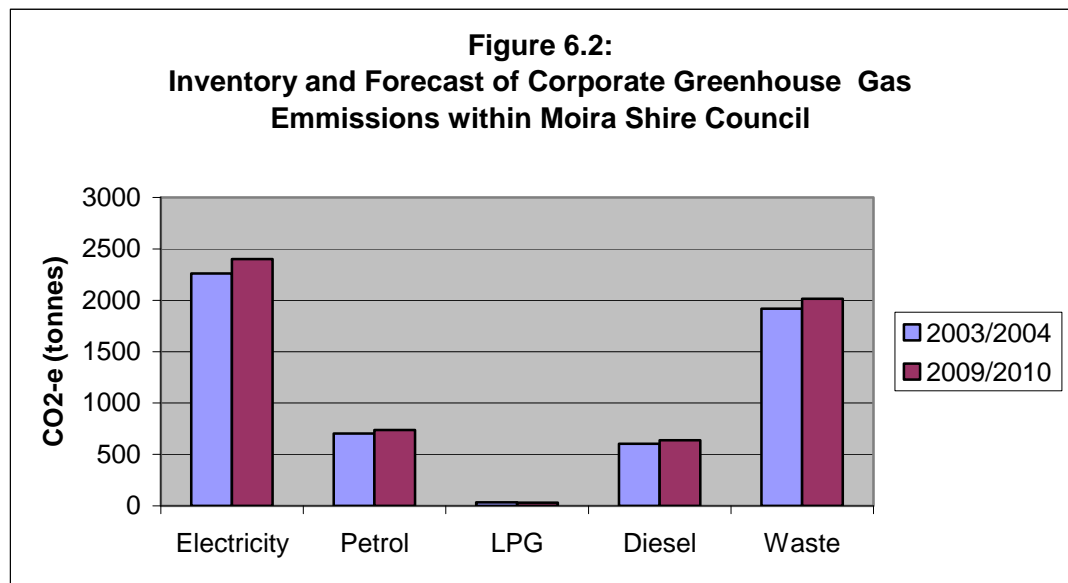
Moira Council has demonstrated a strong commitment to mitigate the risk of climate change by actively participating in the ICLEI Cities for Climate Protection™ program designed to decrease greenhouse gas emissions. Through the Program, the council will educate the community about climate change, and the causes, together with promoting ways to actually reduce emissions such as through home lighting alternatives and energy efficiency measures.

As the first step in the Cities for Climate Protection Program, an inventory and forecast of green house gas emissions in the Moira Shire has been completed. The inventory and associated forecast is broken down into:

- 'Corporate' emissions - which are emissions originating from Moira Council's organisational operations; and
- 'Community' emissions - originating from the general municipality of Moira Shire.

6.9.1 Results of Emissions Inventory and Forecast - Corporate

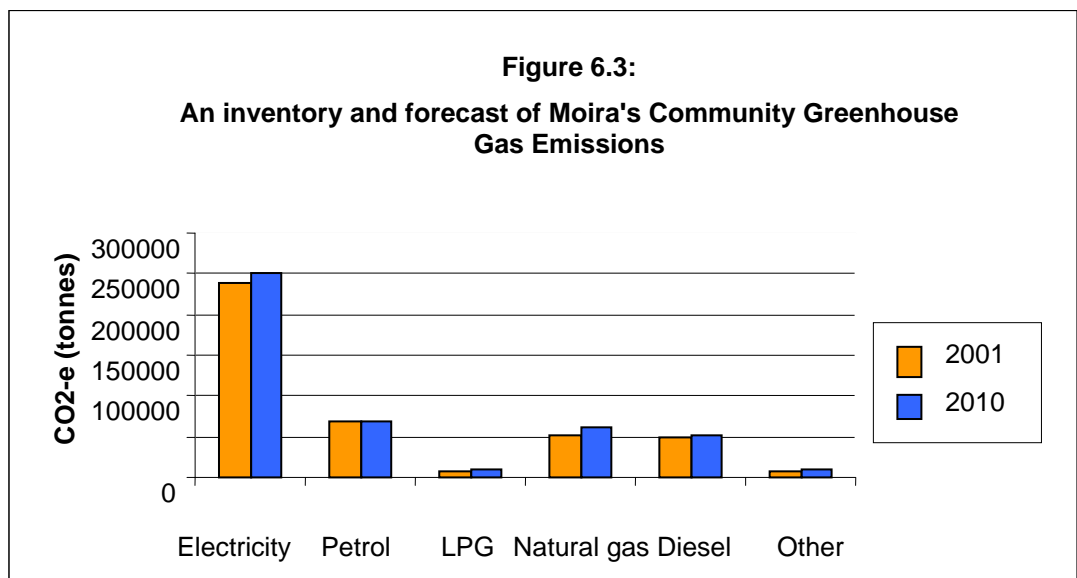
(Reference: Moira Council - Officer Reports for Information, Ordinary Meeting 20/06/2005)



The shire's corporate greenhouse gas emissions are expected to increase by 5.06% from 5517 tonnes CO<sub>2</sub>-e in 2003/2004 to 5811 tonnes CO<sub>2</sub>-e in 2009/2010, with electricity remaining the highest contributor of emissions.

6.9.2 Results of Emissions Inventory and Forecast - Community

(Reference: Moira Council - Officer Reports for Information, Ordinary Meeting 20/06/2005)



The agriculture sector produced 52.9% of the total emissions released from community activities in 2001.

## 7.1 Moira Planning Scheme (Clause 21.03 – Environment)

The Planning Scheme sets up broad objectives for land use and managing the impacts of use and development within the Shire and is underpinned by the objectives in the Community Plan. The Planning Scheme can provide specific and targeted tools with which to implement, or deliver some of the objectives and targets in the Natural Environment Strategy. Clause 21.03 of the Planning Scheme effectively contains Council's environment strategy and identifies the methods, or instruments, to implement it.

The key objectives of Clause 21.03 support the vision and objectives in the Natural Environment Strategy and recognise the same threatening processes. In particular, the Planning Scheme seeks to address the following environmental issues:

- Compliance and consistency with State and Regional environmental planning policies and strategies;
- The protection of the Shire's natural features and bioregions;
- The management and control of the water table and salinity;
- The management and control of flooding;
- The co-ordination of available land and water resources for sustainable development; and
- The effective and appropriate management of effluent disposal.

## 7.2 State Planning Policy

The State Planning Policy framework identifies a number of environmental considerations and local and regional environmental strategies that Council must have regard to in its decision making and operations. Under the State Planning Policy framework, Council is committed to working with all its delivery partners (CMA, DSE, water authorities etc) to ensure that the implementation of the many natural resource management plans and strategies is a shared responsibility.

An integral part of any Planning Scheme are specific overlays which are designed to assist with consistent and considered assessment of developments regarding specific concerns affecting the natural environment. The Moira Planning Scheme has overlays applying to Significant Landscapes, Floodways and Heritage but does not currently have overlays that deal with managing impacts for:

- Vegetation management
- Water quality
- Environmental significance
- Wildfire management
- Riparian areas
- Heritage (although is currently under development)

The Planning Scheme outlines a number of areas for further strategic work and application of policy that complements the objectives and direction of this Strategy. It is anticipated that the Strategy and Planning Scheme will operate together to achieve the objectives for environmental management.

### 8.1 Commonwealth Legislation and Policy

#### *Environment Protection and Biodiversity Conservation Act 1999*

This Act provides a national framework for environment protection by protecting matters of national environmental significance and the conservation of Australia's biodiversity. The Act requires that anyone planning an action that may have an impact on a matter protected by the Act refers the project to the Commonwealth Environment Minister.

This Act is particularly relevant to the Barmah Wetland which is listed internationally for its environmental significance and therefore comes under Commonwealth consideration.

#### *National Weeds Strategy (1997)*

Weeds are of a national concern, prompting the release of the National Weeds Strategy by the Australian Government. Moira Shire achieves many of the State's aims through the implementation of the Moira Shire Council Roadside Management Plan (2004).

### 8.2 Statutory Legislation and Policy

#### *The Environment Protection Act (Vic) 1970*

This Act seeks to ensure that those who discharge to, or pollute, the environment are controlled and held responsible for their actions. The key areas this Act applies to are the Moira Shire's Landfill facilities with respect to odour, dust and groundwater contamination.

#### *Flora and Fauna Guarantee Act 1988*

This Act establishes the process for listing species, communities and threatening processes and outlines mechanisms for the protection, conservation and management of Victoria's communities of flora and fauna.

#### *Catchment and Land Protection Act 1994*

This Act establishes the framework for the integrated management and protection of catchments. It provides the system for the control of pest animals and noxious weeds and encourages community participations in the management of land and water resources.

#### *Crown Land (Reserves) Act 1978*

This Act prescribes the conditions for the reservation and management of crown lands in Victoria. It describes the procedures for the use of crown land for active and passive recreation and other public uses.

#### *Fisheries Act 1995*

This Act regulates the management and conservation of Victorian fisheries and aquatic habitats. It deals with the protection of important aquatic biota and the treatment of noxious aquatic biota as well as licensing and regulations relating to commercial and recreational fishing.

#### *Local Government Acts 1989*

The Act establishes the legislative framework for the support of Victorian local councils. It prescribes the objectives, roles and functions of local councils, and the division of some responsibilities between local council and state and federal governments.

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### ***National Parks Act 1975***

The National Parks Act includes all national parks, state parks, national marine parks and national marine sanctuaries in Victoria. It aims to protect wilderness areas and the natural environment in these parks. The Act covers the management of parks to balance the competing needs of preservation, scientific values and also the recreational uses of such areas.

### ***Planning and Environment Act 1987***

The Act gives a framework for the use of land for the use and development of land. The Act is designed to protect the beneficial use of land for living, working and recreation. Also within the scope of the Act is the protection of the environment, important buildings and structures, and public assets. The Act aims to balance the present and future needs of Victorians in regard to the environment and land use.

### ***Water Act 1989***

The Act provides for the management of all aspects of the terrestrial part of the water cycle, including surface water, groundwater and waterways. It aims to ensure water resources are managed in a sustainable way and encourages the provision of efficient water services. The Act covers all public and private rights to water.

White paper water reforms will bring structural change to the irrigation industry, with subsequent environmental, economic and social impacts throughout the Shire.

Environmental flows, managed by the CMA, have potential to revitalise river and wetland environments by restoring some seasonal flood patterns.

Unbundling of water rights into high and medium security water and delivery capacity shares will offer enable water users to tailor water investments to suit individual enterprises.

Water use licenses, to be administered by the CMA, offer greater ability to optimise irrigation efficiency and prevent excess water use, particularly on inappropriate soil types.

Trading of permanent water-right out of the Shire could have a substantial impact on rate revenue from 2008 when water right will no longer be included in property values.

Reconfiguration (retirement of un-viable assets) is yet to take effect. It will be important for the Shire to monitor this process.

### **State Environment Protection Policies**

The State Environment Protection Policies (SEPPs) outline the framework for the implementation of the Environment Protection Act. SEPPs exist for:

- Air quality management
- Ambient air quality
- Contaminated land
- Groundwater
- Landfill
- Noise
- Noise from commerce, industry and trade
- Used packaging materials
- Waters

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### **Victorian Biodiversity Strategy (1997)**

This Strategy complements the National Strategy and the Flora and Fauna Guarantee Act. It demonstrates how conserving biodiversity is a part of everyday life and how our actions can affect biodiversity outcomes. It provides overarching direction for biodiversity conservation and management in Victoria and is coordinated with other natural resources management mechanisms such as Regional Catchment Strategies.

### **Victorian Native Vegetation Management Framework (2002)**

This Victorian Government Framework describes the government's goals and aspirations for native vegetation management. It provides a consistent approach to valuing native vegetation and a reporting framework for net gain accounting.

The framework is facilitated via the state planning provisions with vegetation clearance applications jointly assessed by council and state government.

### **Victorian Weeds Strategy (1999)**

Following the release of the National Weeds Strategy (1997) the Victorian Government launched the Victorian Weeds Strategy (1999) which provides direction for weed management and eradication in Victoria and complements the National Weed Strategy.

Moira Shire achieves many of the State's aims through the implementation of the Moira Shire Council Roadside Management Plan (2004).

### **Victorian River Health Strategy**

The Strategy provides a common vision for river management across Victoria. It sets a framework for community-based decision making within an integrated catchment management context that is based on scientific understanding, a balance of environmental, social and economic needs, and includes all activities taking impacting on rivers.

### **Murray Darling Basin Salinity Management Strategy 2001-2015**

The Strategy is a 15 year plan with the objectives of maintaining the water quality in the Murray and Darling Rivers for all beneficial uses and controlling the salt loads in tributaries in the Murray Darling River Basin. The Strategy sets targets for salinity, supports a system of salinity credits and debits, includes monitoring and reporting, and highlights targets for on-ground action. On-ground actions identified include the redesign of farming systems, the reforestation and revegetation of catchments, and the construction of salt interception works.

### **Goulburn Broken Catchment Management Authority Regional Catchment Strategy**

A Regional Catchment Strategy is required under the Catchment and Land Protection Act 1994. The RCS is the primary integrated planning framework for land, water and biodiversity management in the catchment and is an over arching strategic document, under which are found the various action plans for these aspects across the catchment.

The GBCMA also develops site-specific management plans for significant environmental assets, such as the Barmah Millewa Environmental Management Plan, Broken Boosey Plan and Kinnairds Wetland Management Plan. These are strategies for protection and enhancement of the assets, along with operational guidelines and performance targets.

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## 8.3 Moira Shire Strategies and Documents

### **Moira Council Plan 2004/2005 – 2007/2008**

The Council Plan identifies strategies and actions to meet the objectives of council over the next three years. A number of actions in the plan relate either to the environment or to activities (such as waste management) that have a direct impact on the environment. These actions are policy and planning based, and refers to investigations and the development of strategies to manage council's activities.

### **Moira Waste Management Strategy (draft)**

The strategy expresses the goal of no waste to landfill by 2015. To this end a number of recommendations are made including best value review, community engagement, extensions to the existing roadside collection system, support for other collections, facilitating the establishment of an organics processing facility, community education regarding litter, upgrades to transfer stations, upgrades to Cobram landfill and sustainability measures such as pricing to reflect true cost.

At present council operates a kerbside program that comprises weekly collection of residual waste, and fortnightly collection of recyclables. There is currently no collection of organics. The shire has one operational landfill at Cobram, and 8 transfer stations. There are also a number of recently closed landfills that require rehabilitation. A recent best value review of the landfill and transfer stations identified a number of issues for attention however the kerbside collection system is regarded as best practice.

### **Moira Urban Stormwater Management Plan**

The aim of the plan is to improve the management of stormwater and the quality of water in the waterways of the shire. It identifies the ways in which council currently manages stormwater, including the planning process, operations and maintenance, and Local laws and enforcement. Council's planning process requires developments to incorporate elements of best practice environmental design, however the strategy identifies the need for greater awareness of these requirements.

The plan states that maintenance of the stormwater drainage network was conducted on an as-needs basis, but that this has begun to change with the development of an asset register with asset conditions used to determine maintenance priorities. There are four gross pollutant traps in Numurkah, and stormwater treatment wetlands have been constructed in Cobram. Council operations that effect stormwater quality include grass slashing in parks, street sweeping and litter management, and operations of depots. The council also has a role to play in stormwater management through education and enforcement of local laws.

Threats to stormwater in Moira Shire include residential runoff, industrial runoff, commercial runoff, construction and development sites, major highways and arterial roads, unstable and degraded waterways, sullage and septic tank overflows, sewer overflows, open spaces, parks and recreational areas, sale yards, upstream inflows.

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### **Moira Roadside Management Plan**

The purpose of the plan is to lay down a framework for the management of roads in a balanced manner which accommodates the various uses of roads. The plan emphasises the ecological importance of roadside vegetation and stresses the need for council to gain further understanding of the significance of roadside vegetation values. Activities currently taking place in roadsides include road maintenance and construction, stock grazing and droving, fire prevention works, provision of services in easements, weed management, community uses, and roadside rehabilitation. These activities all pose threats to the environmental values of the shire, and the plan lists actions to be taken to minimise the risks of these activities. A summary table gives the relative priorities of each of the actions, with a target date for implementation.

### **Moira Municipal Fire Prevention Strategy**

The strategy focuses primarily on reducing the risk of fire causing loss of life, personal effects, or property. The majority of actions identified in the strategy are education and planning based and will not have an environmental impact, however fuel reduction works in rural areas and transport corridors do pose threats to environmental values. The plan discusses the need to undertake fuel reduction works at an appropriate time to minimise the deleterious effects on native vegetation, and refers to the Roadside Management Plan.

### **Moira Environment Advisory Committee Terms of Reference**

The terms of reference set the framework for the operation of the Environment Advisory Committee established in late 2004. The purpose of the committee is to provide recommendations to council on matters of environmental significance that reflect the diversity of perspective of the various groups. The groups represented on the committee include Council, water supply agencies, catchment management authorities, the EPA, DSE, DPI, Vic Roads, Parks Victoria, food manufacturers, local environment groups, indigenous groups, and the general community.

### **Moira Environmental Local Law 2003**

This local law regulates activities that have an effect on the environment. The document sets out prohibited activities, activities that require a permit, and the penalties associated with non-compliance. The law covers safety, people and property, the environment, animals and the disposal of waste

### **Local Sustainability Accord 2006**

Moira Shire will develop a Local Sustainability Accord with the State Government in 2006, setting out the objectives for achieving environmental sustainability and scheduled targets for their completion. The Accord will be in line with existing environmental strategies, particularly the Regional Catchment Strategy.

### **Moira Shire Business Development Strategy**

The Business Development Strategy identifies growth in agriculture, manufacturing and services as the basis for future development. Major opportunities for business development in Moira are identified as being in the areas of new horticultural crops, food processing, light manufacturing, engineering industries, additional retailing, tourism related services, and aged persons services. The strategy recommends that Council focus on attracting investment and business in these areas. None of the actions recommended will have a direct environmental impact.

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### **Moira Municipal Public Health Plan 2004 – 2007**

The plan recognises the role of environment in the health of a community, and categorises the dimensions of the health strategy as built/physical, social, economic and natural. The plan makes a number of recommendations that may impact upon the environment including:

- Consideration should be given to planting shade trees when planning new facilities,
- Council should be involved in developing walking / cycling tracks,
- Council should promote the use of syringe disposal units,
- Council should promote the Butt Out and Quit campaigns,
- Council should encourage increased use of natural resources for recreation,
- Council should encourage development that has clean air and water policies, and
- Public transport should have a clear air policy.

### **Moira Cycling and Walking Strategy (Revised Draft Strategy)**

The strategy aims to improve cycling and walking in the shire over a ten year period. Presently Moira has lower levels of walking and cycling than the state and national averages. At present there is limited walking and cycling infrastructure in the shire, and a large potential for improvement. At present the public transport network in Moira is quite limited and within the community there is a high reliance on private cars to get to work. The provision of better walking and cycling infrastructure can alleviate the need for car usage and hence reduce the environmental impact of a community. A planned river crossing between Cobram and Barooga is to have pedestrian and cyclist access. Ecotourism potential plays a large role in consideration of walking and cycling facilities in the shire, and a proposal currently exists for development of walking and cycling facilities within the Boosey Broken State Park.

### **Moira New Residents Kit**

The residents kit gives an overview of the characteristics of each of the major towns in the Shire, including infrastructure, surrounding land uses, and community profile. It gives a good summary of some of the activities undertaken by council, including the operation of community and sports centres and libraries, management of parks, and waste management. It also supplies information about local laws and regulations.

A comprehensive Risk Profile has been developed to guide priorities for action in this Strategy. The risks that were assessed were those considered to be either under the direct control or influence of Council.

Risks were assessed and scored against the following criteria:

- The probability of the activity causing an environmental impact;
- The exposure to, or frequency of, the activity occurring; or
- The severity, or consequences, of the environmental impact.

All risks were then ascribed a rating which correlates to the score (see assessment spreadsheet for scores):

- High (over 7000) – must manage or mitigate the risk
- Serious (4001 - 7000) – important to manage or mitigate the risk
- Low (less than 4000) – should manage or mitigate the risk

As risks are mitigated, or reduced through successful implementation of the actions, the Risk Profile will be updated with attention turning to the next priority issue.

The risk ranking, or priority, also takes into account the level of community interest, the need for legislative compliance to be demonstrated and the ability of Council to directly influence the activity of concern.

Actions are focused on the high and serious risk activities while recognising that in treating these there is often the opportunity to address lower risk concerns as part of the process involved.

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## 9.1 Activities of Concern

### 9.1.1 Roadside Management

<b>Livestock droving and grazing</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Native flora depletion due to native grasses being trampled and eaten.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ <b>Reduced land sustainability because of erosion caused by water in grazing tracks.</b></li> <li>▪ <b>Native flora depletion because of water in grazing tracks and weed transfer by animal droppings.</b></li> </ul>
<b>Road construction and maintenance</b>	
<b>High Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>High value native grass or vegetation destroyed due to disturbance by activity and machinery</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora depletion due to trampling and removal of native grasses and weed transfer from imported materials.</li> <li>▪ Reduced amenity because of noise.</li> <li>▪ Habitat disturbance due to noise.</li> </ul>
<b>Provision of easements for services</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora depletion due to trampling or removal of native grasses.</li> </ul>
<b>Fire prevention slashing</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Disturbance to vulnerable species habitat (eg Superb Parrot) by damaging midstorey vegetation of feed trees.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora depletion due to reduced ability of native grasses to reseed.</li> <li>▪ Native flora depletion because of damaged midstorey vegetation.</li> </ul>

<b>Fire prevention ploughing</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>High value native grasses and vegetation destroyed or removed and the reduced ability of these grasses to reseed.</b></li> </ul>
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Disturbance to the habitat and feed trees of vulnerable species (eg Superb Parrot) because of damage to mid-storey vegetation</b></li> </ul>
<b>Low Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Native flora depletion due to damage to mid-storey vegetation.</b></li> </ul>
<b>Fire prevention burning</b>	
<b>Serious risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Disturbance to the habitat and feed trees of vulnerable species (eg Superb Parrot) because of damage to mid-storey vegetation.</b></li> </ul>
<b>Low Risk</b>	<ul style="list-style-type: none"> <li>▪ Native flora depletion due to removal of native grasses and reduced ability of these grasses to reseed.</li> <li>▪ Native flora depletion because of damage to midstorey vegetation.</li> </ul>
<b>Insufficient/Inappropriate fire prevention works</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>High value native grass or vegetation destroyed due to not being regenerated or being over run.</b></li> </ul>
<b>Low Risk</b>	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion because of wildfire started by roadside ignition.</li> <li>▪ Public health and safety risks from wildfire started by roadside ignition.</li> <li>▪ Habitat disturbance due to fires started by roadside ignition.</li> </ul>

<b>Weed management – spraying</b>	
High Risk	<ul style="list-style-type: none"> <li>▪ <b>Disturbance to the habitat and feed trees of vulnerable species (eg Superb Parrot) because of damage to mid-storey vegetation.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora depletion due to removal of native grasses and reduced ability of these grasses to reseed.</li> <li>▪ Native flora depletion because of damage to mid-storey vegetation.</li> </ul>
<b>Insufficient/Inappropriate weed management</b>	
High Risk	<ul style="list-style-type: none"> <li>▪ <b>High value native grass or vegetation destroyed due to over run and the depleted ability of these grasses to reseed.</b></li> </ul>
Serious Risk	<ul style="list-style-type: none"> <li>▪ <b>Disturbance to the habitat and feed trees of vulnerable species (eg Superb Parrot) because of damage to mid-storey vegetation</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora depletion due to damage to mid-storey vegetation.</li> </ul>
<b>Tree lopping</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora depletion due to damage to upper-storey vegetation.</li> <li>▪ Disturbance of the habitat of vulnerable species (eg Superb Parrot) due to damage to the upper-storey of Superb Parrot feed trees.</li> </ul>
<b>Irrigation water on or entering roadsides</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora depletion due to weed transfer.</li> <li>▪ Reduced land sustainability because of raised water tables.</li> <li>▪ Reduced land sustainability because of excess nutrients washed into waterways.</li> <li>▪ Degradation of water resources because of increased nutrients washed into waterways.</li> </ul>

**Storage of machinery on roadsides**

Low Risk

- Native flora depletion because of trampling or removal of native grasses and introduction of weeds from imported materials.
- Degradation of water resources because of chemicals washed into waterways.

**Community use of roadsides**

Low Risk

- Native flora depletion because of trampling or removal of native grasses and introduction of weeds from imported material.

## 9.1.2 Waste Management

### 9.1.2.1 Cobram

<b>Inappropriate management of operational cells</b>	
<b>High Risk</b>	<ul style="list-style-type: none"> <li>• <b>Water resources degradation (groundwater) due to insufficient leachate collection.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>• Reduced amenity due to dust, odour and off-site litter.</li> </ul>
<b>Inappropriate management of closed cells</b>	
<b>High Risk</b>	<ul style="list-style-type: none"> <li>• <b>Water resources degradation (groundwater) due to insufficient leachate collection.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>• Water resources degradation (groundwater) due to leachate generation as a result of insufficient capping or poor stormwater management.</li> <li>• Increased greenhouse effect and climate change due to methane generation.</li> </ul>
<b>Mulching</b>	
Low Risk	<ul style="list-style-type: none"> <li>• Native flora depletion because of the transfer of weeds and pathogens.</li> <li>• Habitat disturbance due to the transfer of weeds and pathogens.</li> </ul>
<b>Insufficient increase in recycling effort</b>	
<b>High Risk</b>	<ul style="list-style-type: none"> <li>• <b>Increased infrastructure costs due to increased landfill volume.</b></li> <li>• <b>Water resources degradation (groundwater) due to increased leachate volume to manage.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>• Lack of increase in recycling effort leading to reduced amenity because of increased dust and noise. This issue is low risk.</li> </ul>

9.1.2.2 Yarrawonga and Numurkah

<b>Inappropriate management of closed cells</b>	
<b>High Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation (groundwater) because of insufficient/inappropriate leachate collection.</b></li> </ul>
<b>High Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation (waterways and groundwater) due to leachate generation as a result of insufficient capping or poor stormwater management.</b></li> </ul>
<b>Low Risk</b>	<ul style="list-style-type: none"> <li>▪ Increased greenhouse effect and climate change due to methane generation.</li> </ul>

9.1.2.3 Old Landfills (unlicensed)

<b>Inappropriate management of closed cells</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation (groundwater) because of insufficient/inappropriate leachate collection.</b></li> </ul>
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation (waterways) due to leachate generation as a result of insufficient capping or poor stormwater management.</b></li> </ul>
<b>Low Risk</b>	<ul style="list-style-type: none"> <li>▪ Increased greenhouse effect and climate change due to methane generation.</li> </ul>

#### 9.1.2.4 Collection and Transfer Stations

<b>Kerbside collection of residual waste</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Increased greenhouse effect and climate change due to fleet vehicle use.</li> </ul>
<b>Lack of kerbside collection system for greenwaste</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Increased infrastructure costs because of increased landfill volume.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource degradation (groundwater) due to increased leachate volume to manage. Reduced amenity because of increased dust and noise.</li> <li>▪ Increased greenhouse effect and climate change because of more frequent burning off.</li> </ul>
<b>Collection service for agricultural wastes</b> (including the Drummuster recycling program, household chemicals collection, the Chemcollect program from farm chemicals, and agricultural plastics collection)	
Low Risk	<ul style="list-style-type: none"> <li>▪ Increased greenhouse effect and climate change due to fleet vehicle usage.</li> </ul>
<b>Lack of collection services for agricultural wastes</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resources degradation due to increased leachate volume to manage.</li> <li>▪ Water resource degradation because of spills or disposal into waterways.</li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Increased infrastructure costs due to increased landfill volume.</li> <li>▪ Reduced amenity due to increased dust and noise.</li> </ul>
<b>Mulching at transfer stations</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora depletion because of the transfer of weeds and pathogens.</li> <li>▪ Habitat disturbance because of the transfer of weeds and pathogens.</li> </ul>

9.1.3 Cycling and Walking

<b>Level of facilities and tracks in parks</b>	
<b>Serious risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Reduced amenity because of trampling or removal of vegetation.</b></li> <li>▪ <b>Native flora depletion by trampling or removal of vegetation.</b></li> </ul>
Low risk	<ul style="list-style-type: none"> <li>▪ Increased greenhouse effect and climate change because of higher car usage.</li> </ul>
<b>Building of facilities and tracks in parks</b>	
<b>Serious risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Native flora depletion due to trampling or removal of vegetation and weed transfer from imported material during construction.</b></li> <li>▪ <b>Reduced amenity due to construction and maintenance noise.</b></li> <li>▪ <b>Habitat disturbance due to construction and maintenance noise.</b></li> </ul>

9.1.4 Stormwater Drainage

9.1.4.1 Urban

<b>Residential and open space run-off</b>	
<b>High Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resources degradation because of nutrients and organic matter introduced into waterways.</b></li> <li>▪ <b>Water resources degradation due to sediment build up and wash off into waterways from unpaved roads and unvegetated nature strips.</b></li> </ul>
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resources degradation because of spills or discharges of chemicals ending up in waterways or groundwater.</b></li> <li>▪ <b>Water resources degradation due to animal faeces in water bodies.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion as a result of nutrients and organic matter introduced into waterways.</li> <li>▪ Native flora and fauna depletion due to sediment build up and wash off into waterways from unpaved roads and unvegetated nature strips.</li> <li>▪ Native flora depletion because of spills or discharges of chemicals ending up in waterways or groundwater.</li> <li>▪ Water resources degradation due to spills or discharges of chemicals ending up in waterways or groundwater.</li> <li>▪ Native flora and fauna depletion due to animal faeces in water bodies.</li> </ul>
<b>Industrial run-off</b>	
<b>Serious risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resources degradation because of nutrients and organic matter introduced into waterways.</b></li> <li>▪ <b>Water resources degradation due to sediment build up and wash off into waterways from unpaved roads and unvegetated nature strips.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion because of spills or discharges of chemicals (and from vehicle wash down) ending up in waterways or groundwater.</li> <li>▪ Native flora depletion as a result of weed transfer from vehicle wash down.</li> </ul>

Commercial runoff	
High Risk	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation as a result of rubbish from overfilled bins or littering being transported in runoff.</b></li> <li>▪ <b>Native flora depletion as a result of rubbish from overfilled bins or littering being transported in runoff.</b></li> </ul>
Serious Risk	<ul style="list-style-type: none"> <li>▪ <b>Water resources degradation as a result of spills or discharges of chemicals (and from vehicle wash down) ending up in waterways or groundwater.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native fauna depletion as a result of rubbish from overfilled bins or littering being transported in runoff.</li> <li>▪ Reduced amenity as a result of rubbish from overfilled bins or littering being transported in runoff.</li> <li>▪ Native flora and fauna depletion as a result of spills or discharges of chemicals (and from vehicle wash down) ending up in waterways or groundwater.</li> </ul>
Road and highway runoff	
High Risk	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation due to sediment, litter and organic matter build-up and wash-off into waterways.</b></li> </ul>
Serious Risk	<ul style="list-style-type: none"> <li>▪ <b>Water resources degradation as a result of spills or discharges of chemicals (and from vehicle wash down) ending up in waterways or groundwater.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion as a result of sediment build up and wash off into waterways.</li> <li>▪ Waterway degradation due to tanker chemical spills being transported into waterways.</li> <li>▪ Native flora and fauna depletion due to tanker chemical spills being transported into waterways.</li> <li>▪ Water resource degradation as a result of transport of vehicular deposits including oil, grease and brake dust.</li> <li>▪ Leading to native flora and fauna depletion as a result of transport of vehicular deposits including oil, grease and brake dust.</li> </ul>

**Level of maintenance of stormwater pits, pipes and gross pollutant**

<b>Serious Risk</b>	<ul style="list-style-type: none"><li>▪ <b>Water resource degradation because of sediment and organic matter discharged into waterways.</b></li></ul>
Low Risk	<ul style="list-style-type: none"><li>▪ Flora and fauna depletion due to sediment and organic matter discharged into waterways.</li></ul>

**Inappropriate or insufficiently designed or managed stormwater treatment wetlands**

<b>Serious Risk</b>	<ul style="list-style-type: none"><li>▪ <b>Water resource degradation because of release of nutrients into waterways.</b></li></ul>
Low Risk	<ul style="list-style-type: none"><li>▪ Native flora and fauna depletion because of release of nutrients into waterways.</li></ul>

9.1.4.2 Rural – Dryland

<b>Uncontrolled runoff from farms</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation because of release of nutrients and salt into waterways.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion due to release of nutrients and salt into waterways.</li> </ul>
<b>Insufficient participation in a CMA management program</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Reduced land sustainability because of increased dryland salinity.</b></li> <li>▪ <b>Water resource degradation because of increased dryland salinity.</b></li> </ul>
<b>Removal of dead paddock trees</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Reduced sustainability for land, fauna and water resource degradation.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion.</li> </ul>
<b>Removal of live paddock trees</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Reduced sustainability for land, fauna and water resource degradation.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion.</li> </ul>

9.1.4.3 Rural – Irrigated

<b>Uncontrolled runoff from farms</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation because of release of nutrients and salt into waterways.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion due to release of nutrients and salt into waterways.</li> </ul>
<b>Insufficient participation in a CMA management program</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Reduced land sustainability, water resource degradation</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion because of increased dryland salinity.</li> </ul>
<b>Removal of dead paddock trees</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Reduced land sustainability.</b></li> <li>▪ <b>Water resources degradation.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion.</li> </ul>
<b>Removal of live paddock trees and vegetation</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Reduced land sustainability.</b></li> <li>▪ <b>Water resource degradation.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion.</li> </ul>

9.1.5 Council Operations

9.1.5.1 Open Space

<b>Slashing of grass alongside waterways</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Waterway degradation due to release of organics into waterways.</li> <li>▪ Native flora and fauna depletion due to release of organics into waterways.</li> </ul>
<b>Use of herbicides to remove weeds in recreation areas</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora depletion due to removal of native grasses and reduced ability of these grasses to reseed.</li> </ul>
<b>Use of fertiliser on sporting ovals</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource depletion as a result of wash off of excess nutrients into waterways.</li> <li>▪ Native flora and fauna depletion due to wash off of excess nutrients into waterways.</li> </ul>
<b>Street sweeping</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Increased greenhouse effect and climate change due to fleet fuel use.</li> </ul>
<b>Insufficient street sweeping</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource degradation due to sediment build up and wash off into waterways.</li> <li>▪ Native flora and fauna depletion because of sediment build up and wash off into waterways.</li> </ul>
<b>Pickup of bins provided at local parks and ovals</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Increased greenhouse effect and climate change due to fleet fuel use.</li> </ul>
<b>No provision of bins at local parks and ovals</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource degradation, reduced amenity, or native flora and fauna depletion because of littering.</li> </ul>

9.1.5.2 Council Works Depots

<b>Vehicle washing, generally in unbunded areas</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource degradation or depletion of native flora and fauna due to sediment and fuel wash off.</li> <li>▪ Water resource degradation or depletion of native flora and fauna due to fuel spills.</li> <li>▪ Water resources degradation or depletion of native flora and fauna because of contaminated land occurring.</li> </ul>
<b>Soil storage in unbunded areas</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource degradation or depletion of native flora and fauna due to sediment wash off into waterways.</li> </ul>

9.1.6 Waterways Management

<b>Lack of control of stock and recreational access to waterways</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource degradation because of erosion of stream banks and increased turbidity of streams.</li> <li>▪ Native flora and fauna depletion due to erosion of stream banks and increased turbidity of streams.</li> <li>▪ Water resource degradation due to loss or reduction in riparian vegetation.</li> <li>▪ Native flora and fauna depletion due to loss or reduction in riparian vegetation.</li> </ul>

9.1.7 Wetlands/Reserves Management

<b>Lower level of implementation or participation in the Kinnairds management plan</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource degradation due to release of nutrient or pollutants into waterways.</li> <li>▪ Native flora or fauna depletion due to release of nutrient or pollutants into waterways.</li> </ul>
<b>Lack of implementation or participation in the Broken Boosey</b>	
Serious Risk	<ul style="list-style-type: none"> <li>▪ <b>Depletion of native flora due to community use and absence of fire protection</b></li> </ul>
High Risk	<ul style="list-style-type: none"> <li>▪ <b>Depletion of native flora due to weed invasion</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource degradation due to release of nutrient or pollutants into waterways.</li> <li>▪ Native flora or fauna depletion due to release of nutrient or pollutants into waterways.</li> </ul>
<b>Management of other Council reserves</b>	
Serious Risk	<ul style="list-style-type: none"> <li>▪ <b>Depletion of native flora due to community use and absence of fire protection</b></li> <li>▪ Water resource degradation and habitat disturbance due to minimal protection</li> </ul>
High Risk	<ul style="list-style-type: none"> <li>▪ <b>Depletion of native flora due to weed invasion</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora or fauna depletion due to release of nutrient or pollutants into waterways.</li> </ul>

9.1.8 Sullage and Septic Tank Overflows

<b>Poorly maintained septic systems</b>	
<b>High Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation because of septic tank leaks or spills into waterways.</b></li> <li>▪ <b>Public health and safety impacts from leaks and spills</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion due to septic tank leaks or spills into waterways.</li> </ul>
<b>Combined stormwater and sullage systems</b>	
<b>High Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation due to sullage inflows in waterways.</b></li> <li>▪ <b>Public health and safety impacts</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion due to sullage inflows into waterways.</li> </ul>
<b>Poor drainage and wastewater infrastructure maintenance</b>	
<b>High Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation because of spills or leaks into waterways or groundwater.</b></li> <li>▪ <b>Public health and safety impacts</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion as a result of spills or leaks into waterways or groundwater</li> </ul>

9.1.9 Sewer Overflows

<b>Cross contamination between sewerage and stormwater systems</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation due to spills or leaks into waterways or groundwater.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion because of spills or leaks into waterways or groundwater.</li> </ul>
<b>Emergency relief structure overflows</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource degradation due to spills or leaks into waterways or groundwater.</li> <li>▪ Native flora and fauna depletion as a result of spills or leaks into waterways or groundwater.</li> </ul>

9.1.10 Sale Yards

<b>Sediment and manure</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation due to wash off into waterways (drains).</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion due to wash off into waterways (drains).</li> </ul>
<b>Vehicle Wash-down</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation due to wash-off of sediment, manure and pathogens into drains.</b></li> <li>▪ <b>Water resource degradation due to fuel wash-off into drains and waterways.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion because of wash off of sediment, manure and pathogens into drains.</li> <li>▪ Native flora and fauna depletion due to fuel wash off into drains and waterways.</li> </ul>
<b>Poor drainage and wastewater infrastructure</b>	
<b>Serious Risk</b>	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation as a result of spills or leaks into waterways or groundwater.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion due to spills or leaks into waterways or groundwater.</li> </ul>

9.1.11 Development Approval/Planning

<b>Poor sediment control on development and construction sites</b>	
High Risk	<ul style="list-style-type: none"> <li>▪ <b>Water resource degradation due to sediment wash off.</b></li> </ul>
Low risk	<ul style="list-style-type: none"> <li>▪ Native flora and fauna depletion due to sediment wash off.</li> </ul>
<b>Clearing of native vegetation</b>	
High Risk	<ul style="list-style-type: none"> <li>▪ <b>Habitat disturbance because of removal or destruction of native vegetation.</b></li> </ul>
Low Risk	<ul style="list-style-type: none"> <li>▪ Native flora depletion due to removal or destruction of native vegetation.</li> </ul>
<b>Dam Construction</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource degradation as a result of changes to flow regime and water quality.</li> <li>▪ Native fauna depletion due to loss of fish passage from on-stream dams.</li> </ul>
<b>Developments in floodplains and natural drainage lines</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource degradation, native flora and fauna depletion, infrastructure loss, public health and safety risks, and reduced amenity due to changes to flow regime and water quality.</li> </ul>
<b>Extractive industries</b>	
Low Risk	<ul style="list-style-type: none"> <li>▪ Water resource degradation because of removal or destruction of native vegetation.</li> <li>▪ Native flora and fauna depletion because of removal or destruction of native vegetation.</li> <li>▪ Water resource degradation due to sediment wash off.</li> <li>▪ Native flora and fauna depletion because of sediment wash off.</li> </ul>

**Infrastructure development on or near waterways**

Low Risk	<ul style="list-style-type: none"><li>▪ Water resource degradation as a result of removal or destruction of native vegetation.</li><li>▪ Native flora and fauna depletion because of removal or destruction of native vegetation.</li><li>▪ Water resource degradation due to changes in flow regime and water quality.</li><li>▪ Native fauna depletion as a result of loss of fish passage from on-stream dams.</li></ul>
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**Landforming and lasergrading in irrigation areas**

Low Risk	<ul style="list-style-type: none"><li>▪ Water resource degradation due to removal or destruction of native vegetation.</li><li>▪ Native flora and fauna depletion because of removal or destruction of native vegetation.</li></ul>
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9.1.12 External Strategies and Plans

**Lack of participation in development**

Serious Risk	<ul style="list-style-type: none"><li>▪ <b>Infrastructure risks due to lost opportunity for co-ordination of natural resource management.</b></li></ul>
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**Lack of awareness of implementation implications or plans**

Serious Risk	<ul style="list-style-type: none"><li>▪ <b>Infrastructure risks because of lost opportunity for co-ordination of natural resource management.</b></li></ul>
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## 9.2 Priority Actions

Management Area	Target	Action	Links to Community & Corporate Plans	Existing Activity	Possible Resource or Partnerships	Responsibility	Indicators	Priority
1. Roadside management	<b>1.1 Road construction and maintenance activities</b> Vegetation assessment (or preparation of an environmental management plan) be undertaken for all areas containing high value vegetation prior to any road construction or maintenance activity	<ul style="list-style-type: none"> <li>a) Map roadside vegetation showing areas of significance</li> <li>b) Develop and implement procedures to ensure all road construction and maintenance project specifications require assessment, or an EMP for significant vegetation</li> <li>c) Install signs along areas of significant roadside vegetation</li> <li>d) Establish education program for staff and contractors</li> </ul>	<p>Moira Shire Roadside Management Plan (p13-14)</p> <p>Moira New Resident's Kit (p37)</p> <p>Moira Fire Prevention Strategy (p32 – refers to Roadside Management Plan)</p>	<p><i>Moira Shire Roadside Management plan p13-14</i></p> <ul style="list-style-type: none"> <li>• Guidelines for vegetation management</li> <li>• Guidelines for easements on road reserves, includes vegetation specific data for service providers</li> </ul> <p><i>Moira New Resident's Kit p37</i></p> <ul style="list-style-type: none"> <li>• Support sought to cut grass and remove fire hazards</li> <li>• Information on what should be cut</li> </ul>	<p>Vic Roads</p> <p>CMA</p> <p>DSE</p> <p>PV</p> <p>CFA</p>	<p>Council</p> <p>Council</p> <p>Council/DSE/Vic Roads</p>	<p>No reports or observations of infraction non-compliance</p> <p>Level of fines in relation to reports/observations</p> <p>% of areas mapped and signs installed</p>	
	<b>1.2 Weed management on road shoulders - spraying</b> Ensure that contractors are knowledgeable and competent in flora identification and accurate spraying techniques	<ul style="list-style-type: none"> <li>a) Implement contractor training program</li> <li>b) Contractor performance monitoring implemented and used in ongoing assessment of performance</li> </ul>	<p>Moira Shire Roadside Plan (p15)</p>	<p><i>Moira Shire Roadside Management plan p15</i></p> <ul style="list-style-type: none"> <li>• Guidelines weed review and mapping</li> <li>• Exclusion of weed infested material from roadsides and high conservation areas</li> </ul>	<p>CMA</p> <p>DSE</p> <p>PV</p>	<p>Council</p> <p>Council</p>	<p>Competency recorded</p> <p>Number of audits documented</p>	
	<b>1.3 Weed management – general</b> Levels of weed infestation to be managed in accordance with legislation and regional priorities	<ul style="list-style-type: none"> <li>a) Targeted program for areas of significance</li> <li>b) Establish education program for staff and contractors</li> </ul>	<p>Moira Shire Roadside Plan (p15)</p>	<p><i>Moira Shire Roadside Management plan p15</i></p> <ul style="list-style-type: none"> <li>• Guidelines weed review and mapping</li> <li>• Exclusion of weed infested material from ... high conservation areas</li> </ul>	<p>CMA</p> <p>DSE</p> <p>PV</p>	<p>Council</p>	<p>Area survey</p>	
	<b>1.4 Use and rehabilitation of roadsides</b> Ensure a net gain in quality and quantity of native vegetation.	<ul style="list-style-type: none"> <li>(a) Implement, monitor and enforce permit conditions.</li> <li>(b) Develop revegetation plan and guidelines.</li> <li>(c) Seek funding and implement programs for roadsides.</li> <li>(d) Ensure offset implementation for vegetation removal.</li> <li>(e) Provision of technical expertise.</li> </ul>	<p>Moira Shire Roadside Plan (p15)</p> <p>Moira Environmental Local Law</p> <p>Planning regulations</p>	<p><i>Moira Shire Roadside Management plan p15</i></p> <p><i>Issue livestock permits</i></p> <p><i>Issue Planning permits</i></p>	<p>CMA</p> <p>DSE/DPI</p> <p>Federal/State Government grants</p>	<p>Council</p>	<p>Net gain documented</p>	
	<b>1.5 Information on significant vegetation</b> Map roadside vegetation and prioritise significance within 12 months and update roadside management plan	<ul style="list-style-type: none"> <li>a) Survey undertaken</li> <li>b) Spatial representation completed including level of significance</li> <li>c) Moira Shire Roadside Plan maps updated</li> </ul>	<p>Moira Shire Roadside Plan (p7)</p>	<p><i>Moira Shire Roadside Management plan p7</i></p> <ul style="list-style-type: none"> <li>• Guidelines review of roadside vegetation values (current knowledge not sufficiently extensive)</li> <li>• Updating of vegetation maps</li> <li>• Consideration to incorporation of information into planning overlays</li> </ul> <p><i>Moira New Resident's Kit p37</i></p> <ul style="list-style-type: none"> <li>• Support sought to cut grass and remove fire hazards</li> <li>• Information on what should be cut</li> <li>• Inspections and issuing of notices to owners</li> </ul>	<p>CMA</p> <p>DSE</p> <p>PV</p>	<p>Council / Vic Roads</p>	<p>% of area surveyed and mapped</p>	

Management Area	Target	Action	Links to Community & Corporate Plans	Existing Activity	Possible Resource/Partnerships	Responsibility	Indicators	Priority
<b>2. Waste Management Cobram</b>	<b>2.1 Management of operational cells</b> Zero target for unacceptable ingress of leachate to groundwater - within 12 months of adopting the Strategy	a) Groundwater monitoring regime reviewed for adequacy and redesign and implemented if necessary b) Leachate collection ponds to be regularly pumped to remain below cell sump/groundwater levels and audited for performance	Moira Shire Council Waste Management Strategy 2004 – 2015 (p18)	<i>Moira Shire Waste Management Strategy p 18</i> • Works required at operating landfill to comply with operational licence	EPA CRC for Waste Management and Pollution Control	Council  Council	Regular assessment/review of monitoring program results documented and reported  Audit/operational logs	
	<b>2.2 Management of closed cells</b> Zero target for unacceptable ingress of leachate to groundwater - within 12 months of adopting the Strategy	a) Groundwater monitoring regime reviewed for adequacy and redesign and implemented if necessary. b) Implement 5 year capital works program for waste to ensure backlog of rehabilitation is completed and to ensure future progressive rehabilitation.	Moira Shire Council Waste Management Strategy 2004 – 2015 (p18)	<i>Moira Shire Waste Management Strategy p 18</i> • Aftercare monitoring program of closed landfills being established	EPA CRC for Waste Management and Pollution Control	Council	Monitoring results recorded and assessment reported	
	<b>2.3 Recycling effort</b> Reduction in volumes of waste going to landfill in accordance with Regional Waste Management targets – within 12 months of adopting the Strategy	a) Review waste educational campaign and implement recommended changes	Moira New Residents' Kit (p48-50) Moira Shire Council Waste Management Strategy 2004 – 2015 (p12)	<i>Moira New Resident's Kit p 48</i> • Information on recycling service • Fortnightly collection provided  <i>Moira Shire Waste Management Strategy p 12</i> • Existing fortnightly recycling service, bins provided • Transfer stations near landfills to collect recyclables	Sustainability Victoria	Council	Land fill volumes	
<b>Yarrowonga</b>	<b>2.4 Management of closed cells</b> Zero target for unacceptable ingress of leachate to groundwater - within 12 months of adopting the Strategy	a) Groundwater monitoring regime reviewed for adequacy and redesign and implemented if necessary	Moira Shire Council Waste Management Strategy 2004 – 2015 (p18)	<i>Moira Shire Waste Management Strategy p 18</i> • Aftercare monitoring program of closed landfills being established	EPA CRC for Waste Management and Pollution Control	Council	Monitoring results recorded and assessment reported	
<b>Numurkah</b>	<b>2.5 Management of closed cells</b> Zero target for unacceptable ingress of leachate to groundwater - within 12 months of adopting the Strategy	a) Groundwater monitoring regime reviewed for adequacy and redesign and implemented if necessary	Moira Shire Council Waste Management Strategy 2004 – 2015 (p18)	<i>Moira Shire Waste Management Strategy p 18</i> • Aftercare monitoring program of closed landfills being established	EPA CRC for Waste Management and Pollution Control	Council	Monitoring results recorded and assessment reported	
<b>Old Landfills (unlicensed)</b>	<b>2.6 Management of closed cells</b> Zero target for unacceptable ingress of leachate to groundwater - within 12 months of adopting the Strategy	a) Groundwater monitoring regime implemented	Moira Shire Council Waste Management Strategy 2004 – 2015 (p18)	<i>Moira Shire Waste Management Strategy p 18</i> • Aftercare monitoring program of closed landfills being established	EPA CRC for Waste Management and Pollution Control	Council	Monitoring results recorded and assessment reported	

Management Area	Target	Action	Links to Community & Corporate Plans	Existing Activity	Possible Resource/Partnerships	Responsibility	Indicators	Priority
<b>3. Stormwater management</b>	<b>3.1 Residential run-off</b> Sediment, litter and organic matter loads from major drainage points to waterways reduced in accordance with Council's Urban Stormwater Management Plan	a) Necessary infrastructure identified and installed b) Monitoring of major drainage points undertaken c) Establish enforcement program for stormwater management	Moira Urban Stormwater Management Plan Volume 1 (p8, 18-27)  Moira Urban Stormwater Management Plan Volume 2 (p40-49)	<i>Moira Urban Stormwater Management Plan Volume 1 p 18 – 27</i>  • Strategies for stormwater, including urban runoff  • Strategy for dealing with sediment transport  • Water quality program for shire has been recommended  <i>Moira Urban Stormwater Management Plan Volume 2 p 40 – 49</i>  • Current practice for regulating and enforcing stormwater related issues	CMA EPA	Council  Council	Monitoring results	
	<b>3.2 Industrial run-off</b> Zero target for high impact incidents related to chemical spills or discharges entering waterways or groundwater – within 12 months for industry and 5 years agriculture	a) Exercise spill incident management or emergency response each 12 months b) Education campaign and emergency contact publicised	Moira Urban Stormwater Management Plan Volume 1 (p18-27)  Moira Urban Stormwater Management Plan Volume 2 (p82-83)  Moira Shire Council Waste Management Strategy 2004-2015 (p14)	<i>Moira Urban Stormwater Management Plan Volume 1 p 18 – 27</i>  • Strategies for stormwater, including industrial runoff  <i>Moira Urban Stormwater Management Plan Volume 2 p 82 – 83</i>  • Industrial runoff - threat to stormwater  <i>Moira Shire Council Waste Management Strategy 2004-2015 p14</i>  • Household Chemical Collection every 18 to 24 months  • New Farm Chemical Collection (Chemclear) – to replace Chemcollect	Industry associations EPA	Council/EPA/CFA  Council/CFA	Attendance  Distribution/Delivery success	
	<b>3.3 Commercial runoff.</b> Zero target for high impact incidents related to litter entering waterways	a) Bin requirements/collection cycles to be revised b) Establish enforcement program for stormwater management	Moira Urban Stormwater Management Plan Volume 1 (p82-83)  Moira Urban Stormwater Management Plan Volume 2 (p18-27)	<i>Moira Urban Stormwater Management Plan Volume 1 p 18 – 27</i>  • Strategies for commercial runoff  <i>Moira Urban Stormwater Management Plan Volume 2 p 82 – 83</i>  • Commercial runoff recognised as threat to stormwater	Local Development Committees and Chambers of Commerce	Council	Incidents observed/reported	
	<b>3.4 Road and highway runoff</b> 25% reduction in sediment, litter and organic matter loads entering waterways from major drainage points – within 12 months of adopting the Strategy	a) Necessary infrastructure identified and installed b) Monitoring of major drainage points undertaken	Moira Urban Stormwater Management Plan Volume 1 (p27)  Moira Shire Roadside Management Plan (p10-12)	<i>Moira Urban Stormwater Management Plan Volume 1 p 27</i>  • Water quality program for shire has been recommended  <i>Moira Shire Roadside Management Plan p10 – 12</i>  • Guidelines for road construction and maintenance	Vic Roads CMA	Council  Council	Monitoring results	
	<b>3.5 Residential and open space runoff</b> Sediment, litter and organic matter loads from major drainage points to waterways reduced in accordance with Council's Urban Stormwater Management Plan	a) Necessary infrastructure identified and installed b) Monitoring of major drainage points undertaken c) Establish enforcement program for stormwater management	Moira Urban Stormwater Management Plan Volume 1 (p8, 18-27)  Moira Urban Stormwater Management Plan Volume 2 (p40-49)	<i>Moira Urban Stormwater Management Plan Volume 1 p 18 – 27</i>  • Strategies - stormwater & urban runoff  • Strategy - sediment transport  • Water quality program for shire  <i>Moira Urban Stormwater Management Plan Volume 2 p 40 – 49</i>  • Current practice for regulating and enforcing stormwater related issues	CMA EPA	Council  Council	Monitoring results	

Management Area	Target	Action	Links to Community & Corporate Plans	Existing Activity	Possible Resource/Partnerships	Responsibility	Indicators	Priority
<b>4. Planning and development approvals</b>	<b>4.1 Sediment control on development and construction sites</b>  No sediment loads to waterways from new development(s) approved from June 2007	a) Planning scheme to reflect this requirement and enforce	Moira Urban Stormwater Management Plan Volume 1 (p31-34)  Moira Urban Stormwater Management Plan Volume 1 (p82-83)	<i>Moira Urban Stormwater Management Plan Volume 1 p 31 – 34</i>  • Incorporation of best practice stormwater management into land-use planning, urban design and development  • Education and Training  • Regulation and enforcement  <i>Moira Urban Stormwater Management Plan Volume 2 p 82 – 83</i>  • Development sites recognised as threat to stormwater	Building Industry Associations  Local Development Committees	Council	Water sensitive urban design principles employed	
	<b>4.2 Clearing of native vegetation</b>  Ongoing Net gain in vegetation across the Shire demonstrated	a) Planning scheme to establish Environmentally Significant/Landscape and/or Habitat protection overlays where remnant or quality native vegetation exists  b) Promote Conservation covenants and Section 173 agreements to protect environmentally significant sites  c) Establish enforcement program of compliance with planning permits and illegal clearing of vegetation	Moira Shire Council Plan 2004/2005 to 2007/2008 (p32)	<i>Moira Shire Council Plan p 32</i>  • Investigation of planning overlays to protect bio diversity	DSE CMA Trust for Nature	Council    Council	Ha of vegetation increased  Areas protected   Number of participants.	
<b>5. Wetlands and reserves management</b>	<b>5.1 Weed management</b>  Levels of weed infestations are managed in accordance with legislation and regional priorities	a) Targeted program for areas of significance  b) Establish education program for staff and contractors	Moira Shire Roadside Plan (p15)	<i>Moira Shire Roadside Management plan p15</i>  • Guidelines weed review and mapping  • Exclusion of weed infested material from ... high conservation areas	CMA DSE PV	Council	Area survey	
<b>6. Sewage, sullage and septic tanks</b>	<b>6.1 Existing sewerage systems and septic tanks</b>  Develop domestic waste water management plan within one year of adopting Strategy and commence implementation	a) Develop domestic waste water management plan within one year of adopting Strategy and commence implementation	Domestic Waste Water Management Plan (draft)		Water Authorities EPA	Council	Development of Plan	



## 10.1 Contact Websites, Numbers and Addresses

### Country Fire Authority

[www.cfa.vic.gov.au](http://www.cfa.vic.gov.au)

Telephone (03) 5833 2400  
Facsimile (03) 5833 2482  
Address 195-205 Numurkah Road  
(PO Box 932)  
Shepparton Victoria 3630

### Department of Primary Industry

[www.dpi.vic.gov.au](http://www.dpi.vic.gov.au)

#### Customer Service Centre

For all general enquiries and for other DPI offices

Telephone 136 186

#### Head Office

1 Spring Street  
Melbourne VIC 3000  
Telephone (03) 9658 4000  
Facsimile (03) 9637 8100

### Department of Sustainability and Environment

[www.dse.vic.gov.au](http://www.dse.vic.gov.au)

Customer Service Centre

Telephone 136 186

Email: [customer.service@dse.vic.gov.au](mailto:customer.service@dse.vic.gov.au)

#### North East Regional Office

35 Sydney Road  
Benalla VIC 3672

### Environment Protection Authority:

[www.epa.vic.gov.au](http://www.epa.vic.gov.au)

Telephone (03) 5721 7227  
Facsimile (03) 5721 2121  
Address 24 Ely Street  
Wangaratta Victoria 3677

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### **Goulburn Broken CMA**

[www.gbcma.vic.gov.au](http://www.gbcma.vic.gov.au)

Telephone (03) 5820 1100  
Facsimile (03) 5831 6254  
Address 168 Welsford Street  
PO Box 1752  
Shepparton Victoria 3630

### **Goulburn-Murray Water**

[www.g-mwater.com.au](http://www.g-mwater.com.au)

Telephone (03) 5833 5500  
Toll Free 1800 013 357  
Head Office 49 Casey Street  
Tatura Victoria 3616

#### Murray Valley Area

Dillion Street  
Cobram Victoria 3643  
(Ph 03 5871 0112)

### **Moira Shire Council**

[www.moira.vic.gov.au](http://www.moira.vic.gov.au)

Telephone (03) 5871 9222  
Telephone 1300 369 966 (local callers only)  
Facsimile (03) 5872 1567  
Address PO Box 578  
Cobram Victoria 3643

#### After Hours

Emergency Tel. (03) 5871 9222

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## Sustainability Victoria

[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

For queries about programs and services previously provided by the **Sustainable Energy Authority Victoria** use the following details:

**Infoline: 1300 363 744**  
Telephone +61 (03) 9655 3222  
Facsimile +61 (03) 9655 3255  
E-mail [info@sustainability.vic.gov.au](mailto:info@sustainability.vic.gov.au)

Ground floor, 215 Spring Street  
Melbourne  
Victoria 3000

For queries about programs and services previously provided by **EcoRecycle Victoria** use the following details:

**Infoline: 1800 353 233**  
Ph: +61 (03) 9639 3322  
Fax: +61 (03) 9639 3077  
Email: [mailbox@sustainability.vic.gov.au](mailto:mailbox@sustainability.vic.gov.au)

Level 2, 478 Albert Street  
East Melbourne  
Victoria 3002

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## 10.2 References

Catchment and Land Protection Act 1994  
Crown Land (Reserves) Act 1978  
Environment Protection and Biodiversity Conservation Act 1999  
Fisheries Act 1995  
Flora and Fauna Guarantee Act 1988  
Framework for State of Environment Reporting (Commissioner for Environmental Sustainability, August 2005)  
Goulburn Broken Catchment Management Authority Regional Catchment Strategy (2003)  
Goulburn Broken Catchment Management Authority Soil Health Strategy (draft 2002)  
Goulburn Broken Catchment Management Authority Goulburn Broken Native Vegetation Plan (final 2000)  
Local Government Act 1989  
Moira Council Plan 2004/2005 – 2007/2008  
Moira Domestic Waste Water Management Plan (draft)  
Moira Waste Management Strategy (draft)  
Moira Urban Stormwater Management Plan (draft)  
Moira Roadside Management Plan 2004  
Moira Municipal Fire Prevention Strategy  
Moira Environment Advisory Committee Terms of Reference  
Moira Environmental Local Law 2003  
Moira Municipal Public Health Plan 2004 – 2007  
Moira Shire Business Development Strategy  
Moira Cycling and Walking Strategy (Revised Draft Strategy)  
Moira New Residents Kit  
Murray Darling Basin Salinity Management Strategy 2001-2015  
National Parks Act 1975  
National Weeds Strategy (1997)  
North East Catchment Management Authority Native Vegetation Profile for North Eastern Victoria (2000)  
Parks Victoria - Broken-Boosey State Park (2004)  
Planning and Environment Act 1987

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State Environment Protection Policies

The Barmah Forest – A History (Charles Fahey, DCFL 1986)

The Environment Protection Act (Vic) 1970

Victorian Biodiversity Strategy (1998)

Victorian Weeds Strategy (1999)

Victorian River Health Strategy

Water Act 1989

Yarrawonga Biodiversity Action Plan (draft 2005)

Yarrawonga Strategy Plan (Moira Shire Council, 2004)

## 10.3 Glossary

Alluvial floodplain	Low-lying and often extensive area of sediment deposited by a river, generally occurs during floods.
Aquifer	Area of porous rock or soil below ground that contains water. Aquifers come in all sizes (from a few hectares to thousands of square kilometres) and vary depending on the nature of the rock type.
Benthos (benthic)	All aquatic organisms living upon or in the sediment of aquatic systems.
Best Management Practice	The best practicable methods that reflect current knowledge of meeting management objectives such as sustainable development
Biota	The animal and plant life of a region considered as a total ecological entity.
Biodiversity	The variety of life forms: the different plants, animals and micro-organisms, the genes they contain, and the ecosystems they form. It is usually considered at three levels: genetic diversity, species diversity and ecosystem diversity.
Bioregion	A landscape classification based on a range of environmental attributes. The Northern Territory has 25 bioregions, based on groupings of regions with similar geology, landform, soils and vegetation.
Capacity	Refers to individuals, landholders, communities, industry and organisations' collection of skills and knowledge and the ability to implement natural resource management.
Catchment	The source area for runoff flowing to a particular point
Condition	The current state of ecosystem compared to what would be considered pristine.
Conservation	The protection, maintenance, management, sustainable use, restoration and enhancement of the natural environment.
Conservation Status	The extent to which ecosystems remain in their natural condition in relation to their pre-European distribution.
Conservation Tillage	A system where tillage is reduced to the minimum required to achieve a suitable environment for plant establishment. Conservation tillage can reduce erosion and improve soil structure, improve infiltration and moisture efficiency, improve soil health and nutrient retention.
Co-operative management	Management that recognises and integrates the varying knowledge and approaches of different stakeholders.
Degraded	Represents a reduction in the quality of a resource.
Developed	Refers to an area that has been modified beyond its natural state.
Dryland salinity	The process where salts are moved upwards by rising water tables where they accumulate in the soil or are discharged into streams.

Ecologically Invasive Plants	"...weeds that have less direct impacts on humans but are detrimental to the conservation of natural resources. ...They include plants that adversely affect the integrity, conservation value or biodiversity of natural systems." (ANZECC & ARMCANZ 1999, p.7) (includes species on the National Environmental Alert List see Appendix 4x)
Ecologically Sustainable development (ESD)	Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and into the future, can be increased.
Ecosystem	A unique unit comprising a recognisable floristic composition in combination with substrate (lithology/geology layers) and position within the landscape, and including the component biota (where known). An ecosystem map unit should normally be discriminated at a scale of 1:100,000 to 1:250,000.
Ecosystem function.	Ecosystem function is linked to landscape integrity. It encompasses services of nature (ecosystem services), such as soil generation and soil fertility, pollination, control of the vast majority of potential insect pests, water filtration and hydrological balance, and drives the productivity of the land. An adequately functioning ecosystem is vital to achieve this productivity
Endangered	A native species or ecosystem facing a very high risk of extinction in the wild in the near future if causal factors continue operating – listed as endangered or critically endangered under Commonwealth, State or Territory legislation.
Endemic	Originating in a given area and confined to that area.
Environmental indicator	Physical, chemical, biological or socio-economic measures that can be used to assess natural resources and environmental quality.
Exotics	Introduced or alien plant or animal.
Feral Animal	Animals that have established themselves, despite not being indigenous and whose presence cannot be easily controlled.
Geomorphology	The study of landforms and the processes that create them.
Greenhouse gases	Gases in the Earth's atmosphere that allow sunlight through but absorb and capture infrared radiation. Important greenhouse gases include carbon dioxide, methane, nitrous oxide, water vapour, tropospheric ozone and chlorofluorocarbons.
Groundwater	Water that soaks into the ground and is stored in cavities and cracks in the rock layers and between particles of rock and sand.
Ground water dependent ecosystems	Groundwater dependent ecosystems are communities of plants, animals and other organisms whose extent and life processes are dependent on groundwater.
Groundwater Management Unit	Eight areas defined as major aquifer systems for the management of groundwater under the National Land and Water Resources Audit. These are also gazetted Water Control Districts
Habitat	The natural environment in which plants or animals exist.

Index of Stream Condition (ISC)	The ISC is an integrated measure of river five different river health characteristics. Each is given a score between 0 and 10 based on the assessment of a number of indicators. The overall ISC score is the sum of these subindex scores, between 0 and 50. A higher score indicates better river condition.
Integrated Property management plan	Enables primary producers and land managers to make balanced and holistic management decisions that assist in secure long-term sustainability and viability. Takes into account weeds, fire, ferals, biodiversity, strong productive pastures, animal production and land condition.
Invertebrate	Organisms that do not have vertebrae. Includes insects, molluscs, worms (macro invertebrates) and smaller organisms such as mites, arthropods and collembolla (micro invertebrates).
Irrigation salinity	Groundwater recharge is increased by the removal of native vegetation and the addition of irrigation water. When water tables approach the surface, salt builds up by evaporative concentration and soil salinity can result.
JSC	Joint Steering Committee – made up of members of the NT and Commonwealth governments whose responsibility is to oversee their governmental obligations under NHT and NAP.
Land capability	The ability of land to accept a type and intensity of use permanently, or for specified periods under specified management, without permanent damage.
Land degradation	The decline in quality, including the capability, of natural = land resources, commonly caused through improper use.
Land Use	Refers to the type of activity conducted on a parcel of land. Examples of land use include pastoralism or conservation.
Landscape Health	Represents the overall condition of a landscape and is made by comparing the current state of the landscape against a baseline or reference point. The assessment can be based on a series of indicators including native vegetation, land use, soil and hydrology, weeds, feral animals, threatened ecosystems and species.
Landscape Integrity	The extent to which the natural surroundings contribute to the original integrity of the landscape. The term includes the original character, context and range of processes that link the various landscape systems. It provides a measure of how landscape systems are maintained, along with the natural nutrient cycles, energy flows and hydrology. Landscape integrity also provides a measure that encompasses a range of impacts associated with human activities in the Region.
Land suitability	The potential uses of the land based upon consideration of prevailing physical, technical and socio-economic conditions.
Leachate	Liquid formed by the process of water percolation through permeable material, in particular through landfill waste. The composition is determined by physical, chemical and biological processes. Leachate quality is influenced by the type and age of waste, the physical and chemical conditions inside the landfill, and microbiological activity.
Litter	Litter is any solid waste object left behind or placed in an inappropriate location. Any such material or item disposed of in an inappropriate manner is to be regarded as litter - the end outcome of an environmentally undesirable disposal action.
Monitoring	Measuring changes in the quality of the environment in order to guide changes of policy or activity and in order to detect improvements as a result of actions taken.
Nutrients	Chemicals required by plants and animals for growth, including nitrogen and phosphorus. In waterways, if other physical and chemical conditions are optimal, excessive amounts of nutrients can lead to degradation of water quality by promoting excessive growth, accumulation, and subsequent decay of plants, especially algae. Some nutrients can be toxic to animals at high concentrations.

Objective	The objective states what is to be achieved over a time frame of 10yrs plus and covers a range of desired shorter term outcomes that build towards an overall goal.
Organic matter	The part of the soil that includes carbon compounds derived from living organisms, as well as the product of complete decomposition, known as humus.
Program	A discrete set of tasks undertaken by proponents
Ramsar Wetland	Wetland declared a being of International Importance under the Convention of Wetlands, signed in Ramsar in 1971.
Recharge	Refers to the process of which surface water enters the soil and moves beyond the root zone of plants to join the groundwater layer
Regional ecosystems	Ecosystems, or a unique unit mapped at some appropriate scale, comprising a recognisable floristic composition in combination with substrate (lithology/geology layers) and position in the landscape, and including their component biota.
Rehabilitation	The treatment of degraded or disturbed land to achieve an agreed level of capability and stability, preferably at least equal to that which existed prior to degradation or disturbance.
Representativeness	The principle that those areas that are selected for inclusion in protected areas reasonably reflect the biotic diversity of the ecosystems from which they derive.
Riparian vegetation	Vegetation belonging to a river bank and located from the normal river level to the edge of the floodplain.
Risk	Risk is measure of the possibility, and the consequences, of an adverse impact occurring within an environment .
Sediment	Material that is being or has been removed from its original site by the action of wind, water or gravity.
Soil erosion	The detachment and transportation of soil and its deposition at another site by wind, water or gravitational effects. Accelerated soil erosion occurs primarily as a result of the influence of human activities.
Soil health	Considers all aspects of soil collectively, including physical structure, chemical components and biological life.
Sustainable	A resource that can be harvested in a way that does not reduce its available supply.
Strategic activity	A group of programs or tasks to be undertaken to work towards achieving a Management Action Target
Targets	Targets relating to short term (1-5 years) management actions and capacity building needed in the short to medium term. These targets define the desired outcome of an activity and build toward meeting longer term objectives.
Threatened species	A species or ecological community that is vulnerable endangered or presumed extinct. Ecological community is the living component of an ecosystem.
Threatening processes	Limiting factors that threaten, or may threaten, the survival, abundance or evolutionary development of a native species or ecological community.
Tributary	A lower order-stream compared to a receiving water body, such as another stream, river or lake. The term 'Tributary to' indicates the larger water body into which the reported stream flows.
Turbidity	A measure of the amount of light intercepted by a given volume of water due to the presence of suspended and dissolved matter and microscopic biota. Increasing the turbidity of the water decreases the amount of light that penetrates the water column. High levels of turbidity are harmful to aquatic life.

Vegetation condition	A measure of the quality of vegetation. It is usually measured against a baseline or reference point.
Viability	The likelihood of long-term survival of the example/population of a particular ecosystem or species.
Vulnerability	The predisposition of an area to a threatening process. Vulnerability can be expressed in terms of (1) the likelihood of an area being affected by the process; or (2) the timeframe over which the area will be affected. Threatening processes could potentially include land clearing, logging and rising saline water tables. Vulnerability is a fundamental consideration in conservation planning given that the basic purpose of conservation areas is to separate elements of biodiversity from processes that threatens their persistence in situ.
Vulnerable	Species or ecosystems subject to vulnerability and believed likely to move into the 'endangered' category in the near future if the causal factors continue operating and listed as such under Commonwealth, State or Territory legislation.
Water dependent ecosystems	Refer to wetlands, rivers, swamps, marshes, riparian zones, billabongs and groundwater dependent ecosystems.
Weed	Plant species that interfere with the management objective for an area of land at a particular time. Weeds are usually plants that are very prolific, invasive, competitive, harmful, destructive, or difficult to control. Weeds detract from the appearance of landscapes, interfere with the function and health of natural areas, and can be hosts for disease causing organisms and insects
Wetlands	Water bodies including swamps, marshes, billabongs, lakes, salt marshes, mudflats, mangroves, coral reefs, fens, peat lands, or bodies of water – whether natural or artificial, permanent or temporary.



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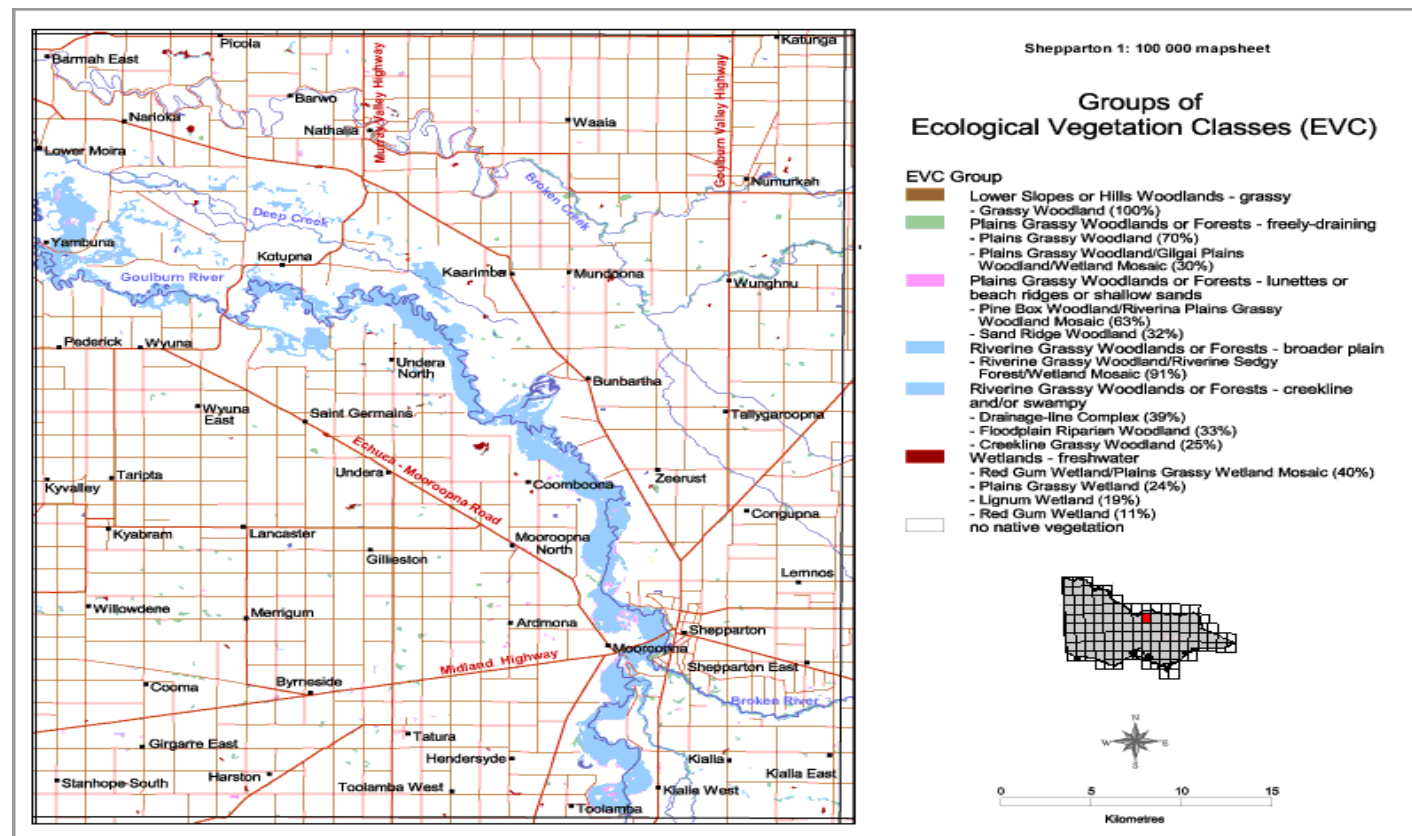
## 11.1 Ecological Vegetation Classes (EVCs)

**Ecological Vegetation Classes (EVCs)** are the basic mapping units used for biodiversity planning and conservation assessment at landscape, regional and broader scales in Victoria.

Each EVC represents one or more plant (floristic) communities that occur in similar types of environments. The floristic communities within each EVC tend to show similar ecological responses to environmental factors such as disturbance (e.g. wildfire). As well as representing plant communities, EVCs can be used as a guide to the distribution of individual species and groups of species, including animals and lower plants (Commonwealth of Australia and State of Victoria, 1999)

**Around the Goulburn and Broken Rivers**, the hills support grassy and shrubby woodlands and box-ironbark forests.

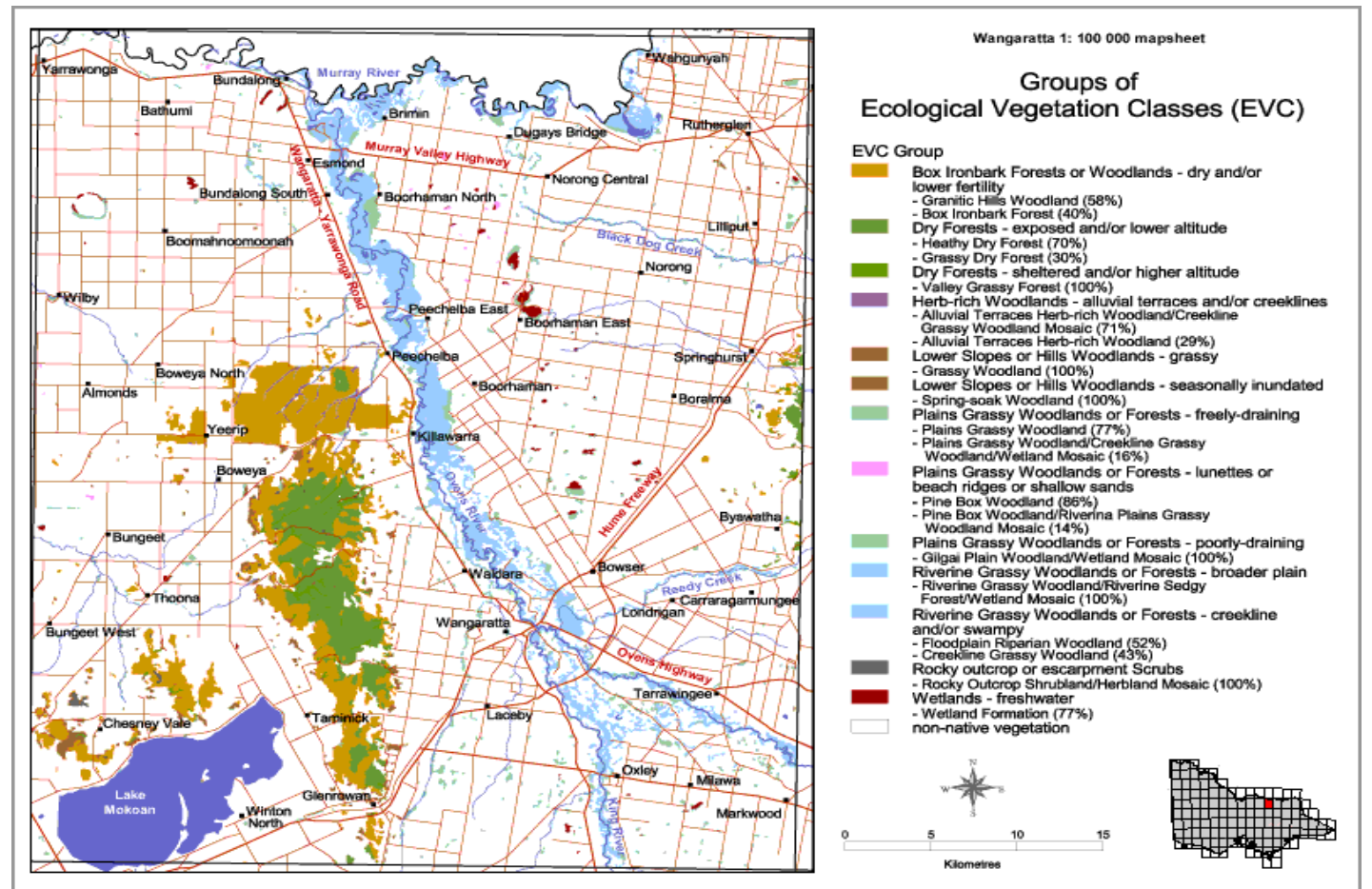
Grassy woodlands dominate the fertile Riverine Plains. Remnant vegetation exists only in scattered pockets along rivers, roadsides and railways. Small blocks of remnant vegetation also exist on private land (GBCMA, 1999).



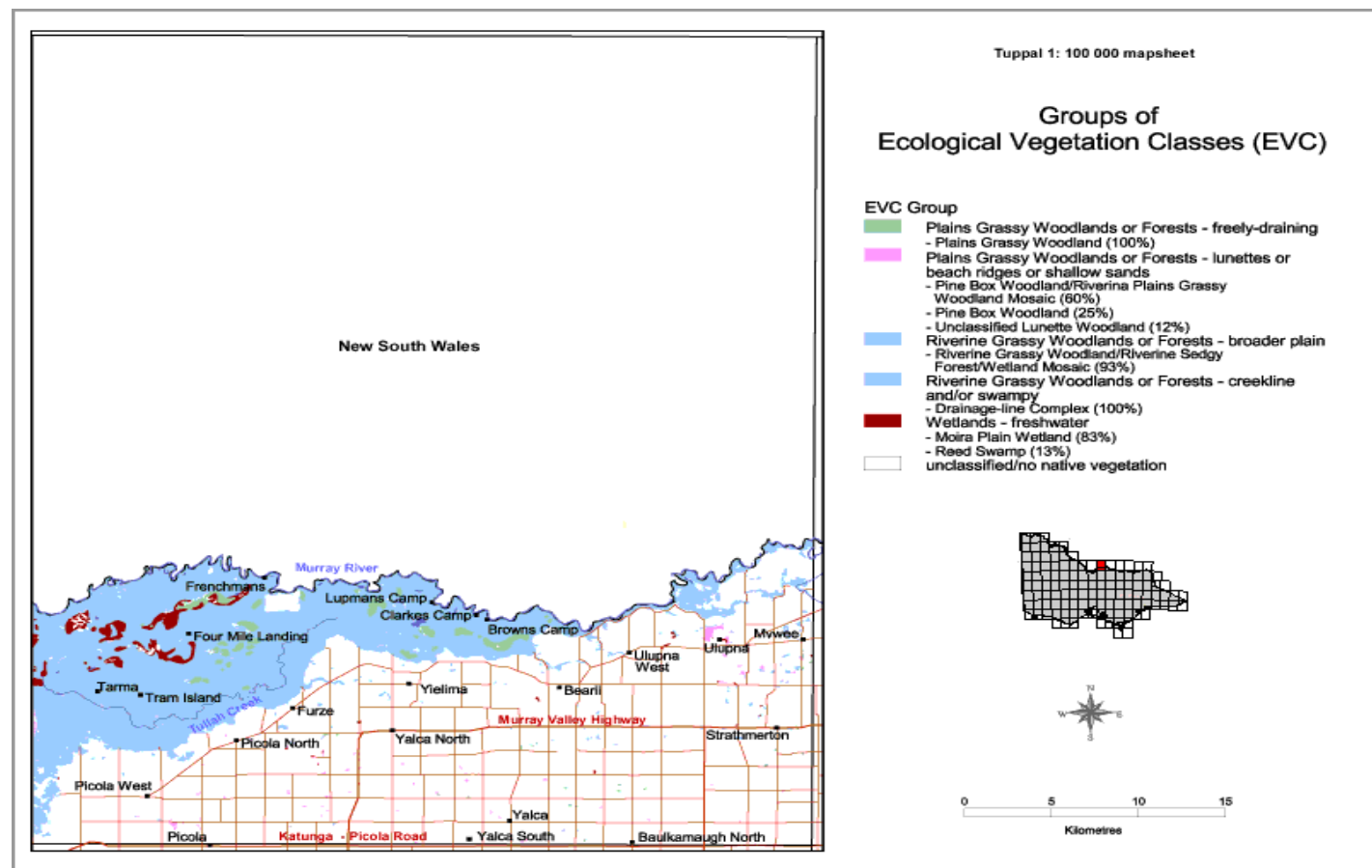


The **Ovens River Plains** are dominated by Yellow Box and Grey Box, with some River Red Gum.

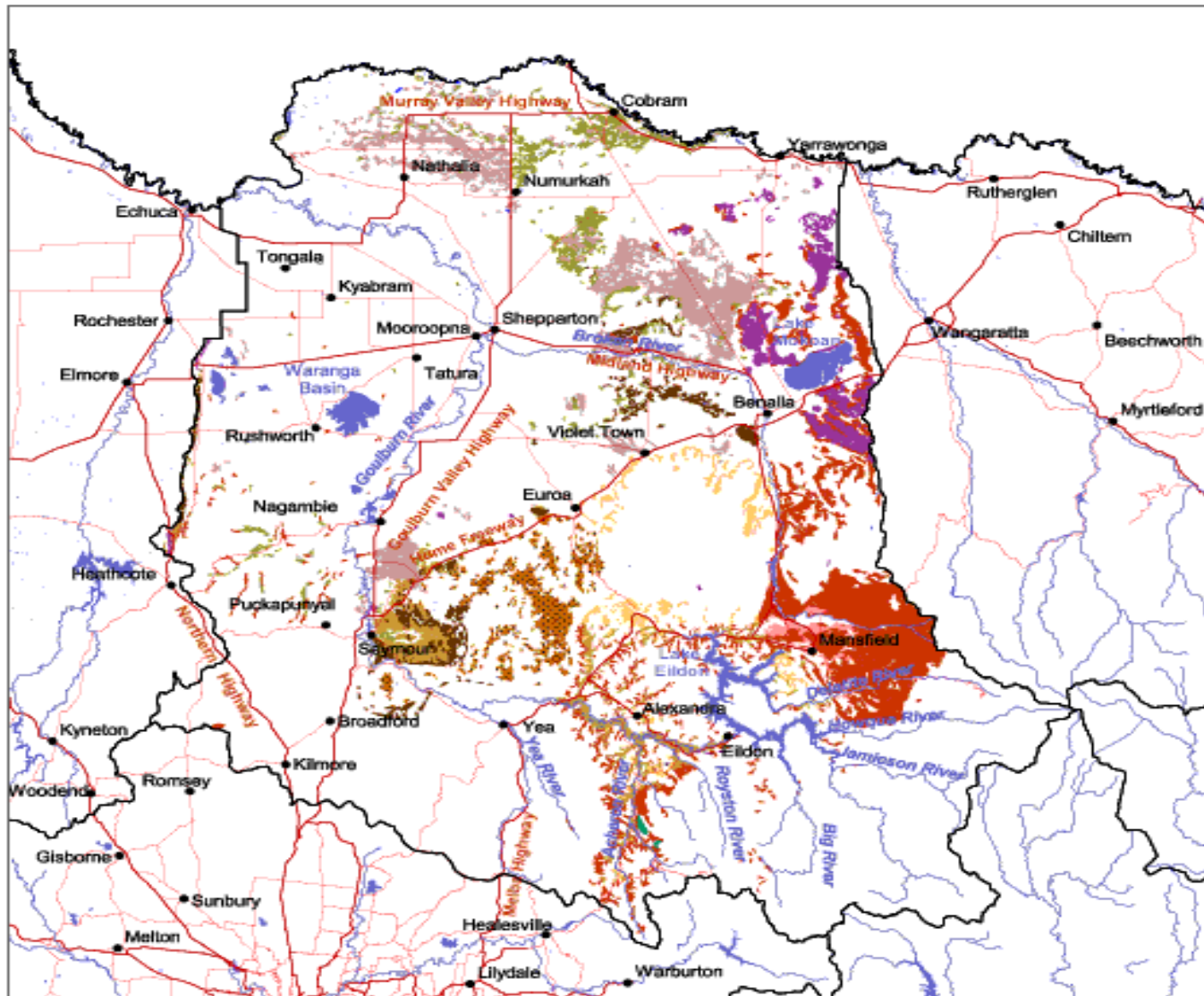
The higher areas support box forests, acacias and shrubby understorey (NECMA, 2000).



Along the **Murray River** riparian vegetation is still present in a continuous line of mature red gums.



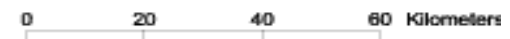
## 11.2 Appendix - Soil maps for GBCMA



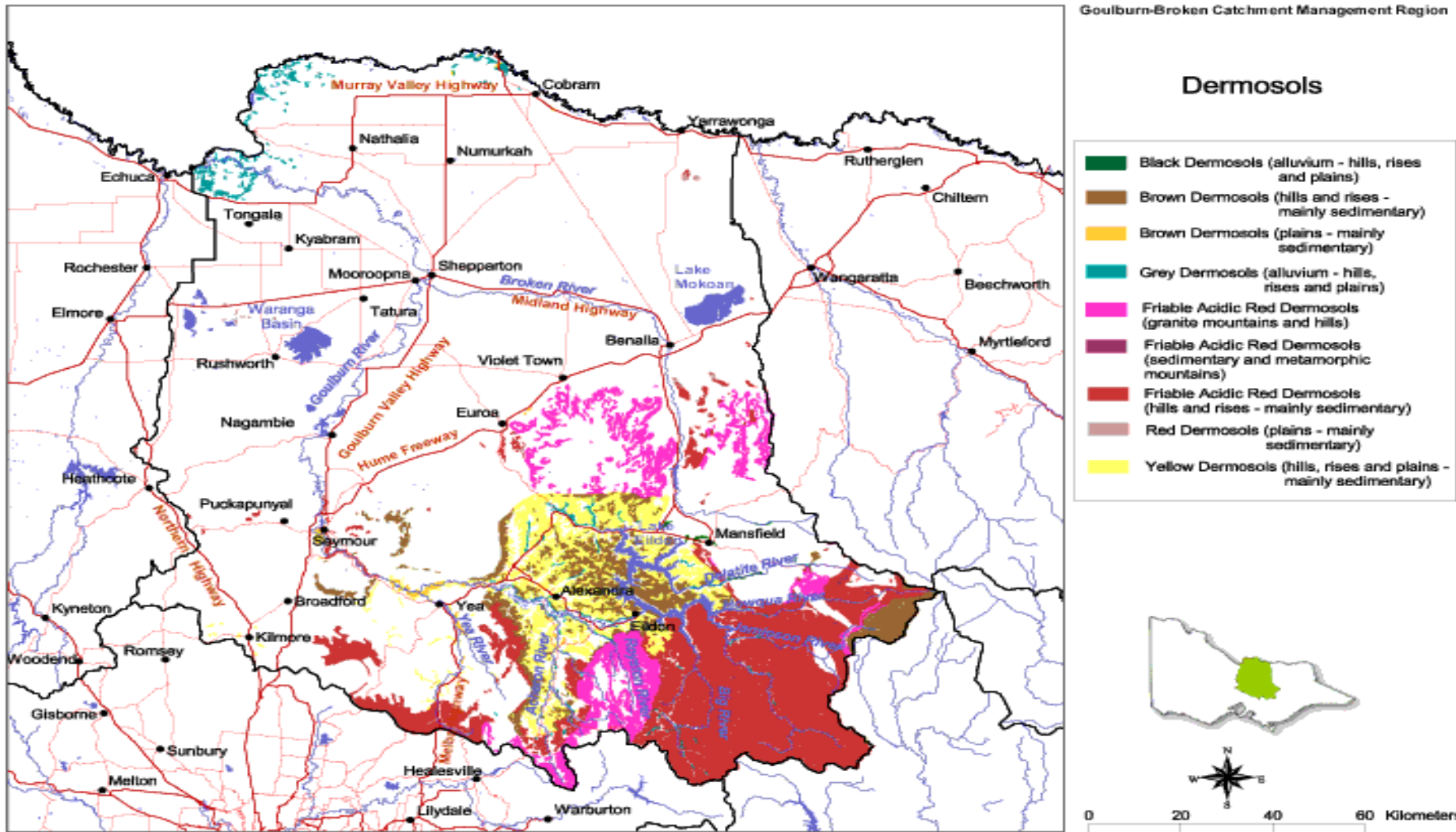
## Chromosols

### Chromosol Type

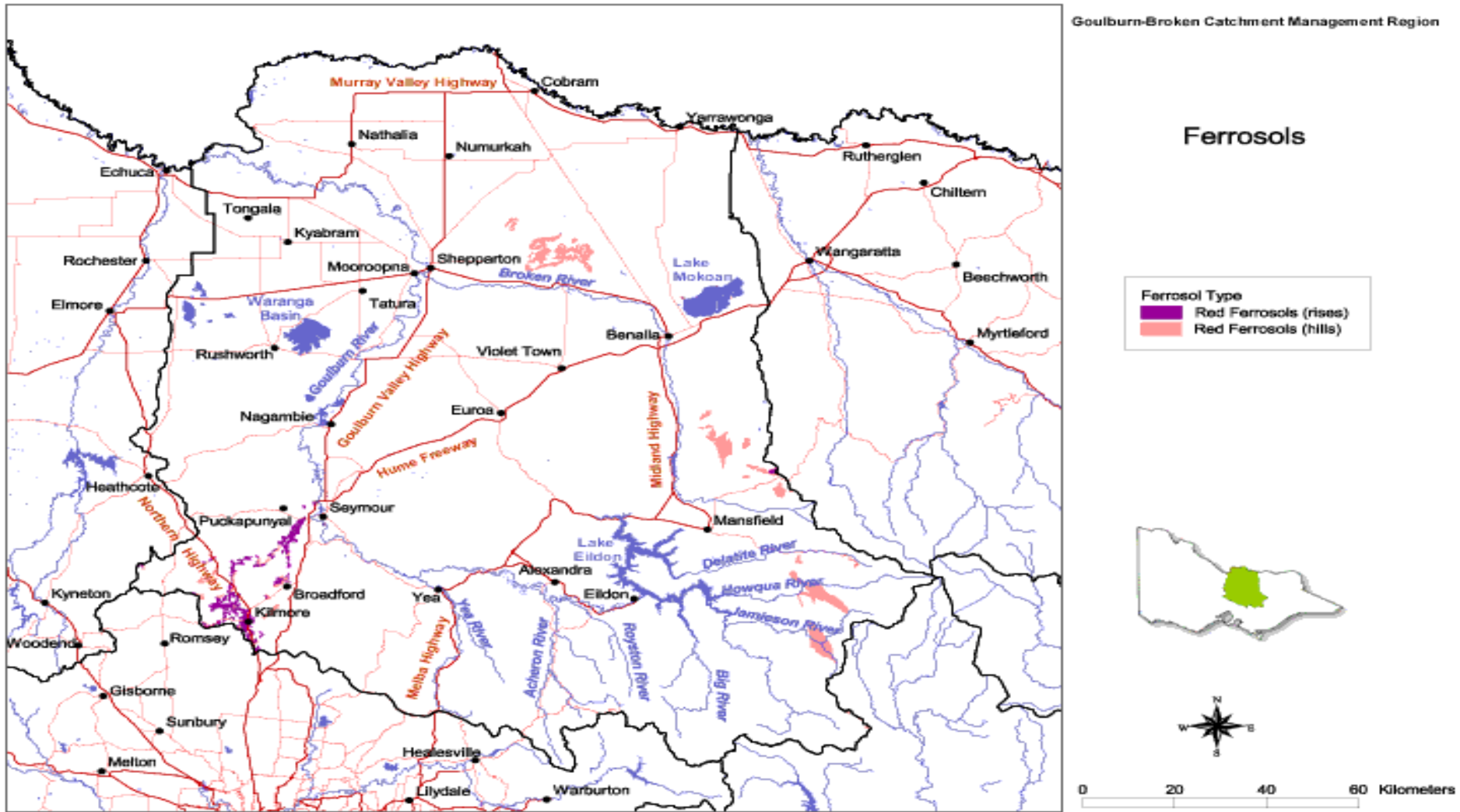
- Brown and Yellow Chromosols [in association with Brown and Yellow Kurosoils] (granite rises and plains)
- Brown and Yellow Chromosols [in association with Brown and Yellow Kurosoils] (granite hills)
- Brown Chromosols (hills)
- Brown Chromosols (rises and plains)
- Brown Chromosols (older alluvial plain)
- Red Chromosols (hills and rises)
- Red Chromosols (plains - often with terraces)
- Red Chromosols (metasediments and sedimentary hills and rises)
- Red Chromosols (older alluvial plain)
- Yellow Chromosols (hills and rises)
- Yellow Chromosols [in association with Yellow Kandosols] (sedimentary hills)



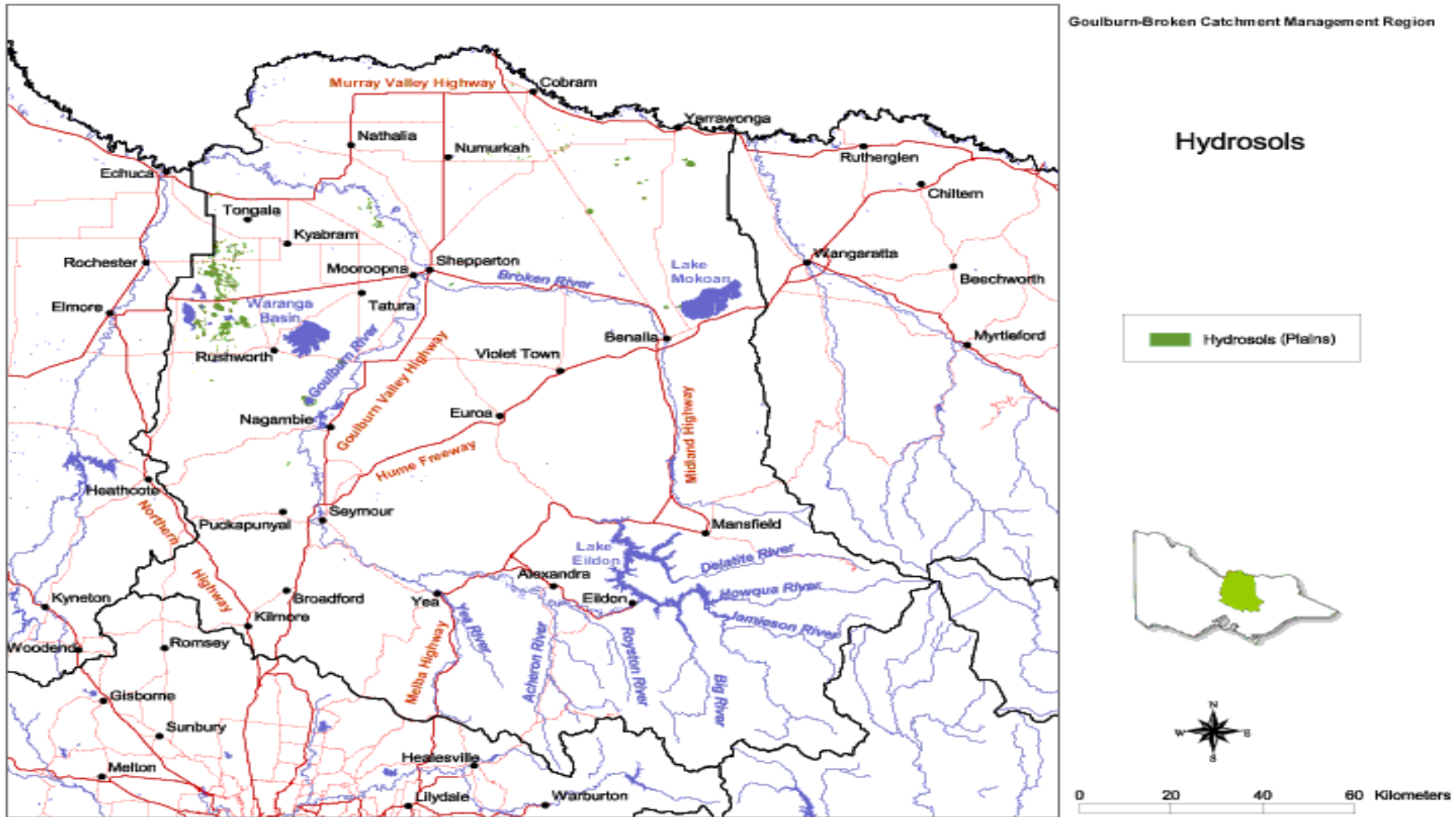
Distribution of Chromosols in the Goulburn Broken Catchment Management Authority Region should this read, produced by (DPI)



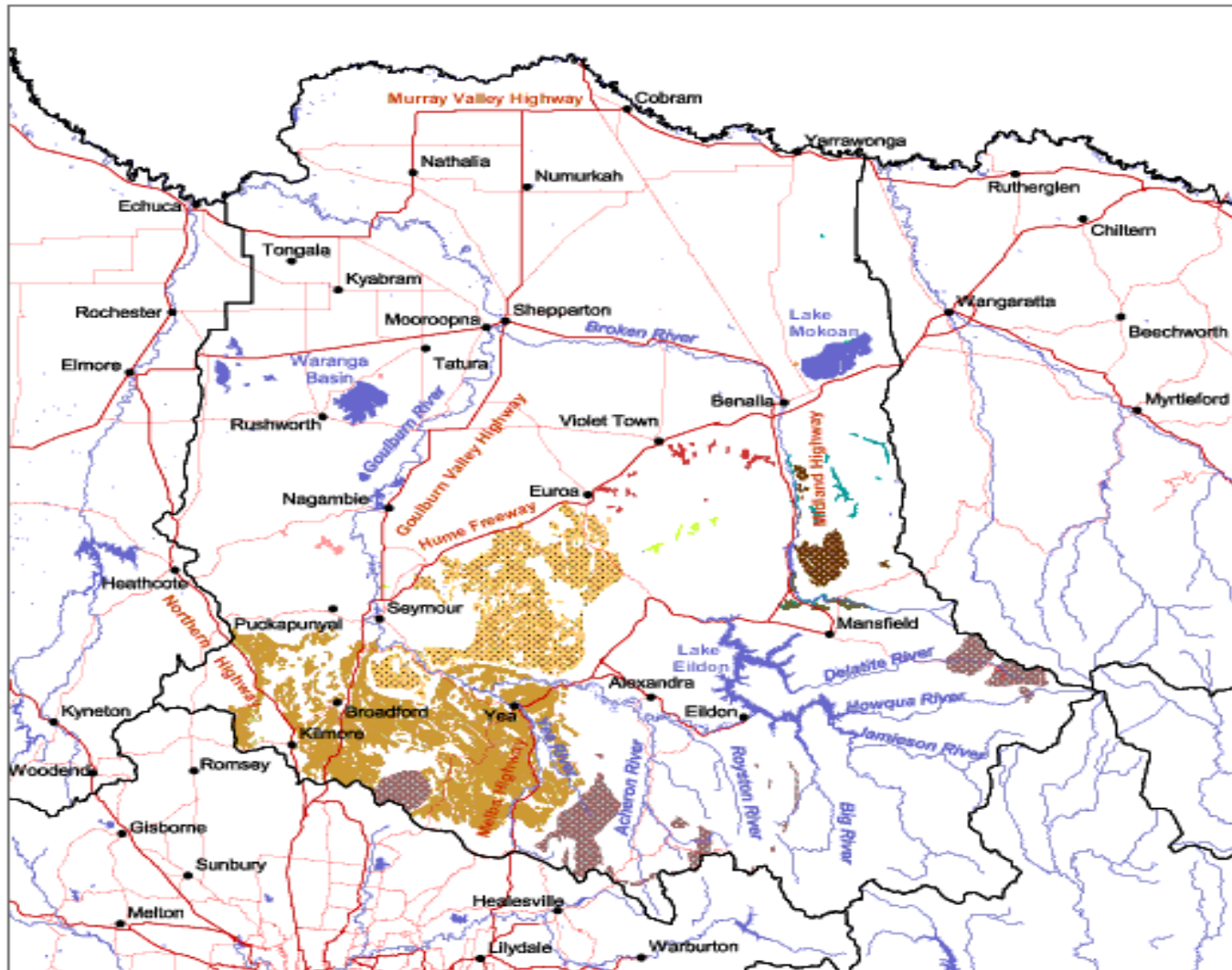
*Distribution of Dermosols in the Goulburn Broken Catchment Management Authority Region (DPI)*



*Distribution of Ferrosols in the Goulburn Broken Catchment Management Authority Region (DPI)*












*Distribution of Hydrosols in the Goulburn Broken Catchment Management Authority Region (DPI)*



Goulburn-Broken Catchment Management Region

## Kandosols

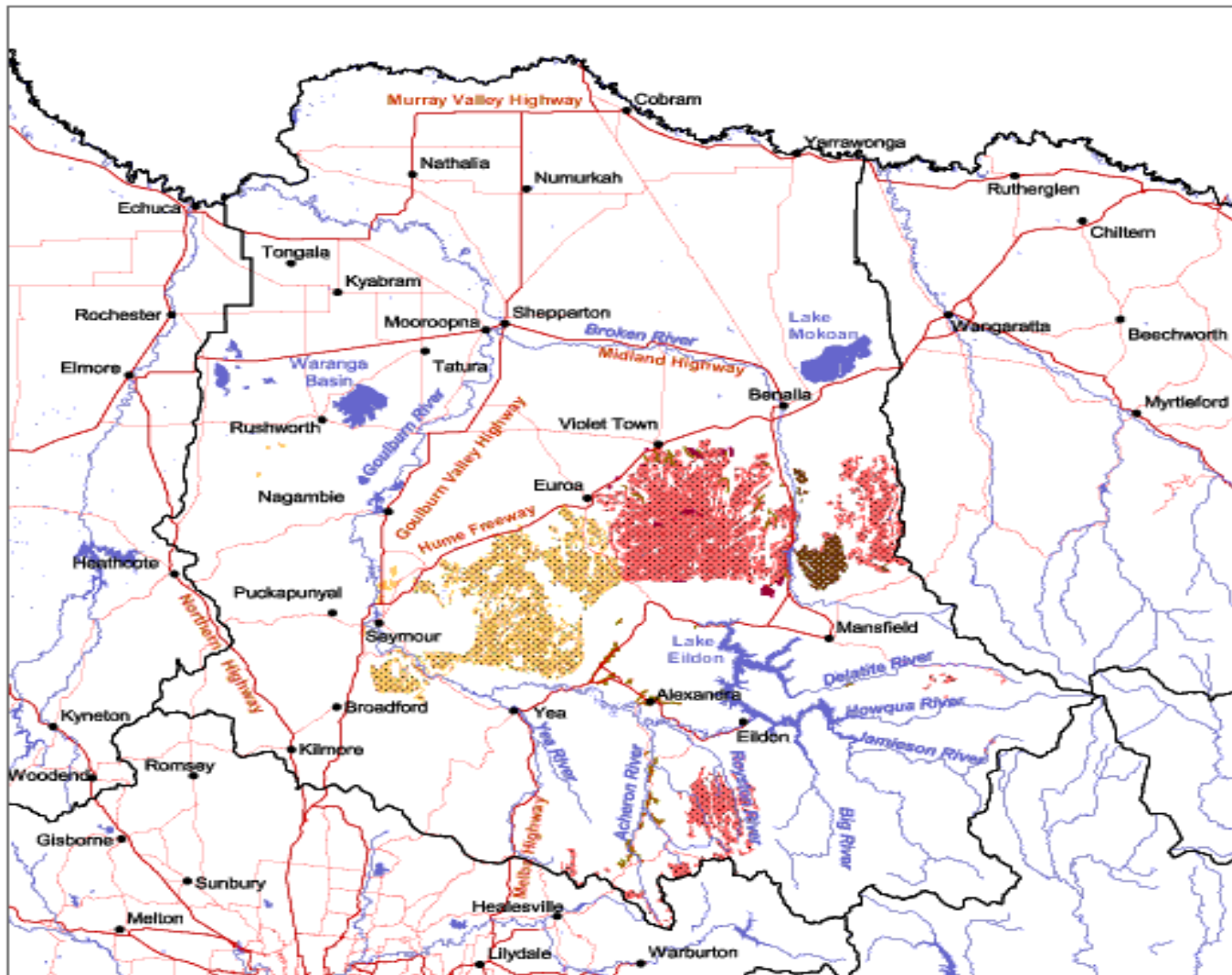
### Kandosol Type

-  Brown Kandosols in association with Brown Kurosoils (granite hills, rises and plains)
-  Brown Kandosols (Lacustrine Plains)
-  Red Kandosols (Acid Volcanic - Plains and Rises)
-  Red Kandosols (Aeolian Plains)
-  Red Kandosols (Granite - Mountains, Hills, Rises and Plains)
-  Red Kandosols (Lacustrine)
-  Yellow and Brown Kandosols [In association with Yellow and Brown Kurosoils] (Granite Hills)
-  Yellow Kandosols (Alluvium/Colluvium)
-  Yellow Kandosols in association with Yellow Chromosols (sedimentary hills)








0 20 40 60 Kilometers

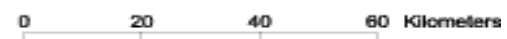
Distribution of Kandosols in the Goulburn Broken Catchment Management Authority Region (DPI)



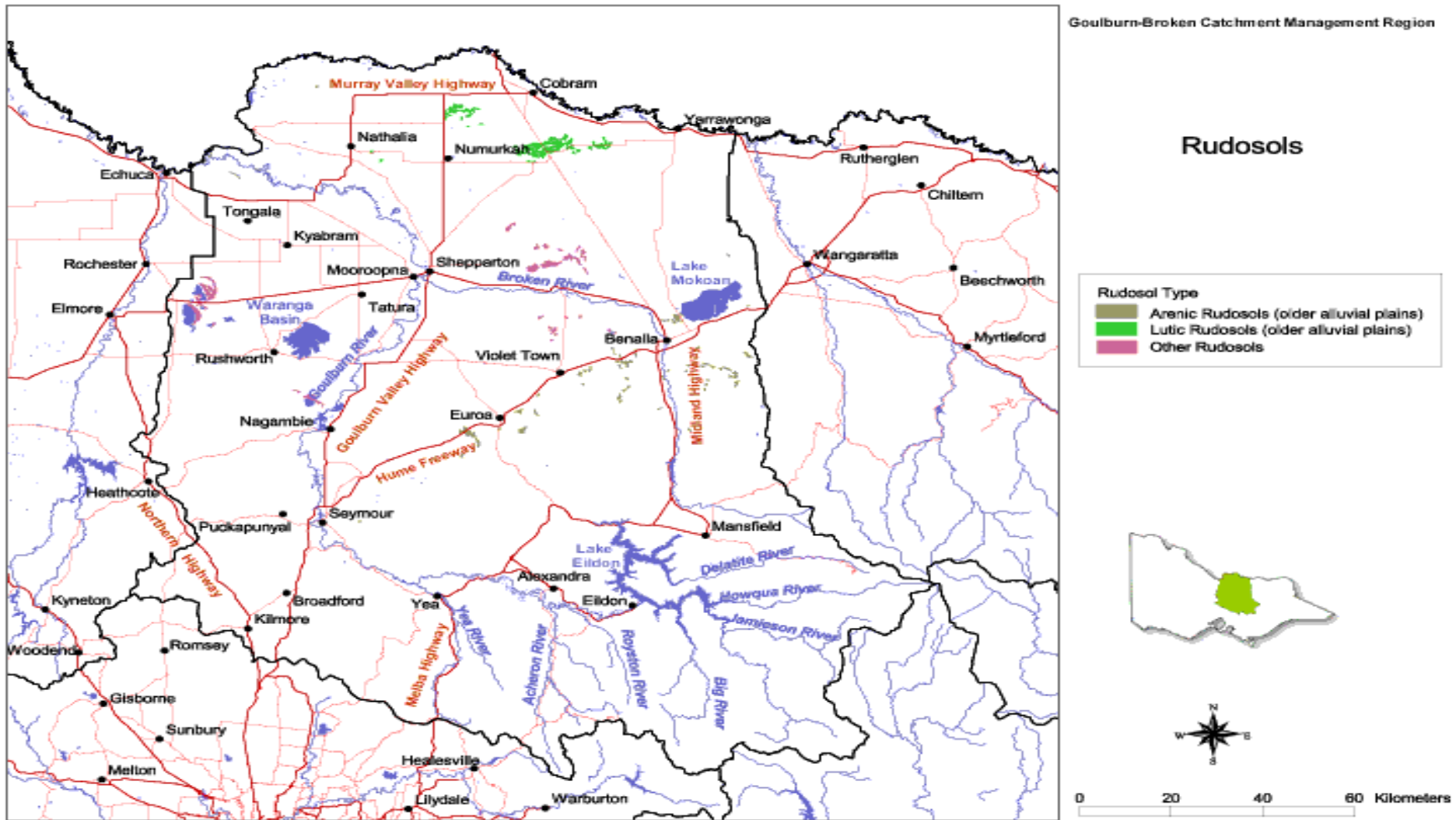
Goulburn-Broken Catchment Management Region

## Kurosols

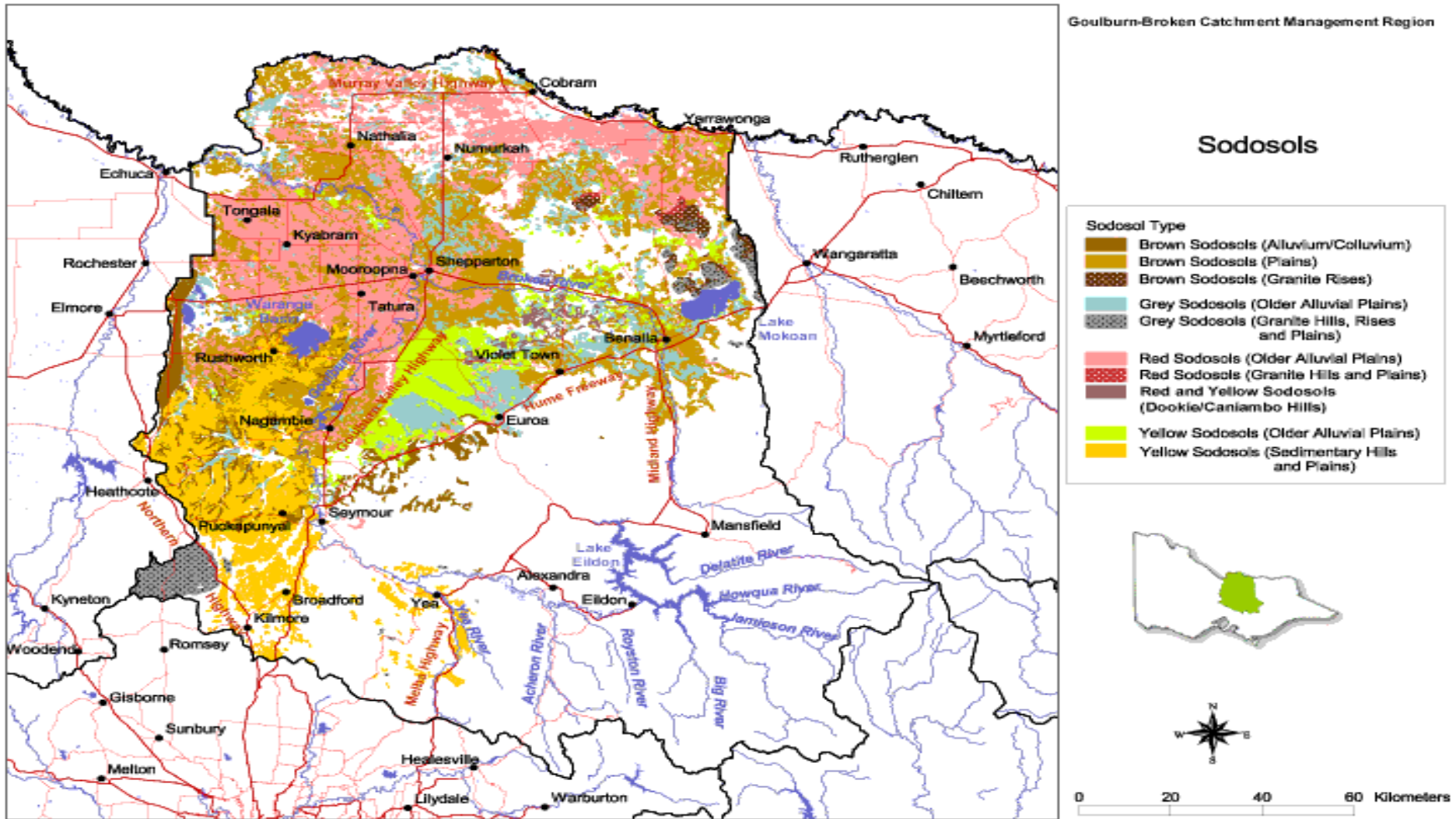
- Kurosol Type**
-  Brown Kurosols [in association with Brown Kandosols] (Granite Hills, Plains and Rises)
  -  Brown Kurosols (Hills and Rises, mainly sedimentary)
  -  Red Kurosols (Granite Rises and Hills)
  -  Red Kurosols (Hills and Rises, sedimentary)
  -  Yellow Kurosols (Fluvial Sediments)
  -  Yellow and Brown Kurosols [in association with Yellow and Brown Kandosols] (Granite Hills)



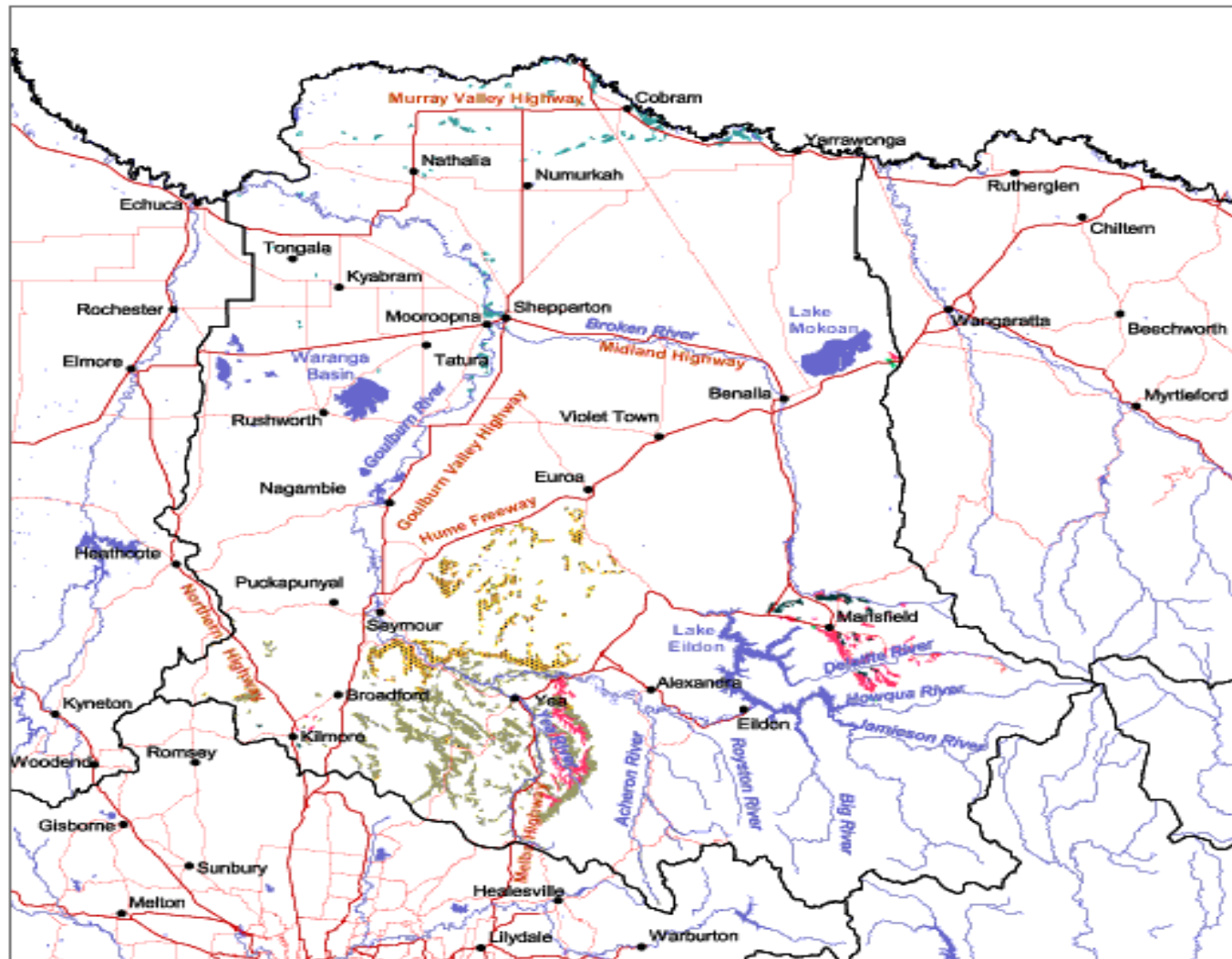
Distribution of Kurosols in the Goulburn Broken Catchment Management Authority Region (DPI)



Distribution of Rudosols in the Goulburn Broken Catchment Management Authority Region (DPI)



Distribution of Sodosols in the Goulburn Broken Catchment Management Authority Region (DPI)

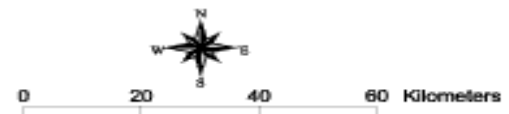


Goulburn-Broken Catchment Management Region

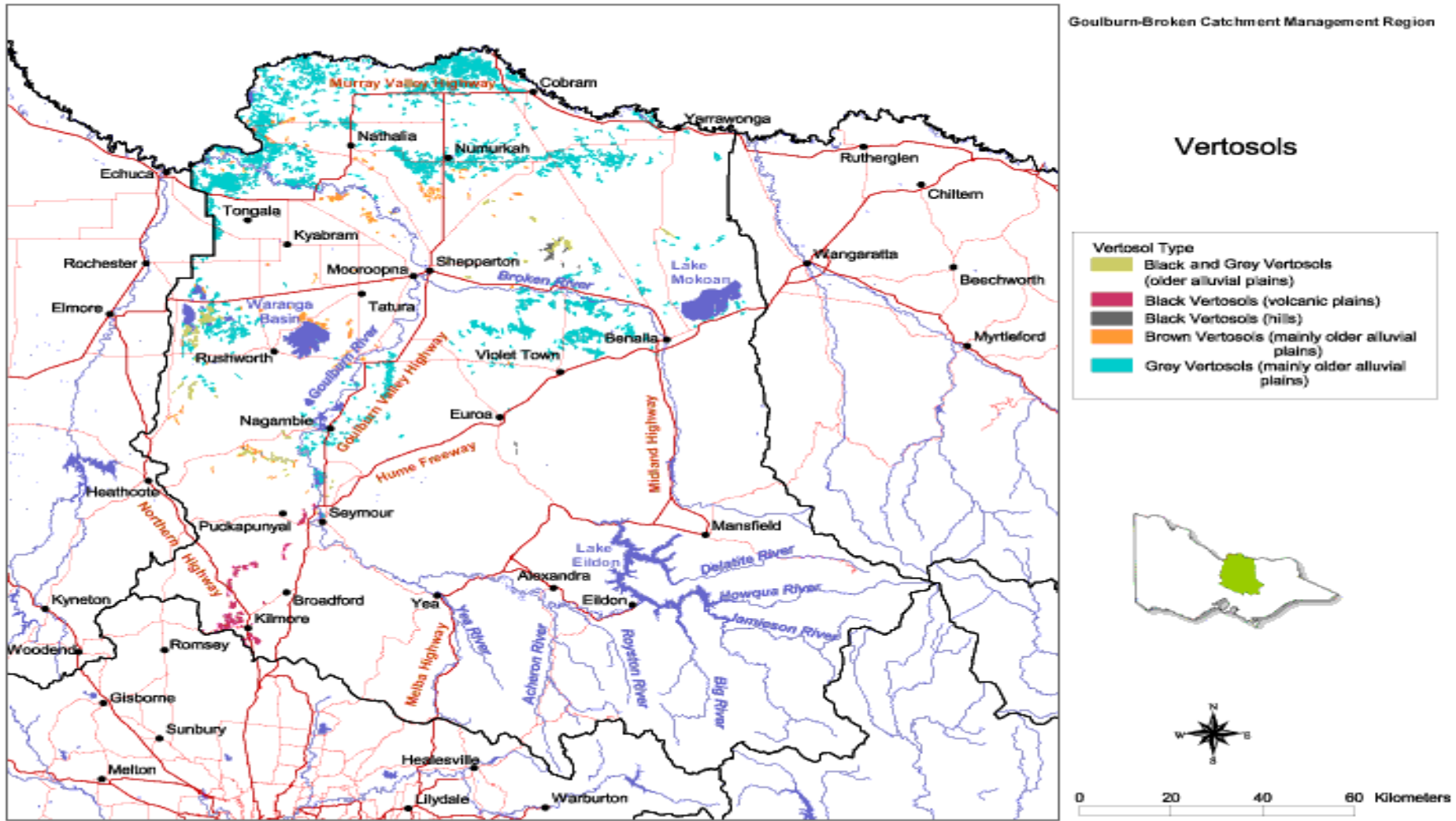
## Tenosols

### Tenosol Type

-  Bleached-Leptic Tenosols (granite hills)
-  Bleached-Leptic Tenosols (hills and rises)
-  Bleached-Orthic/Orthic Tenosols (older alluvial plains)
-  Orthic Tenosols (fluvial conglomerate hills and rises)
-  Orthic Tenosols (gully colluvium/alluvium hills and rises)
-  Orthic Tenosols (gully colluvium/alluvium plains)



Distribution of Tenosols in the Goulburn Broken Catchment Management Authority Region (DPI)



Distribution of Vertosols in the Goulburn Broken Catchment Management Authority Region (DPI)



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Volume 2 - Available for public perusal on request

### 11.3 Appendix - Flora and Fauna Atlas for the region

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Volume 3 – Technical data for Council’s use and not intended for public distribution

**11.4 Appendix - Natural Environment Risk Profile**

**11.5 Appendix - State of Environment Reporting framework**





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34532: May 2005